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SINCLAIR'S SUPERMICRO

QL USER

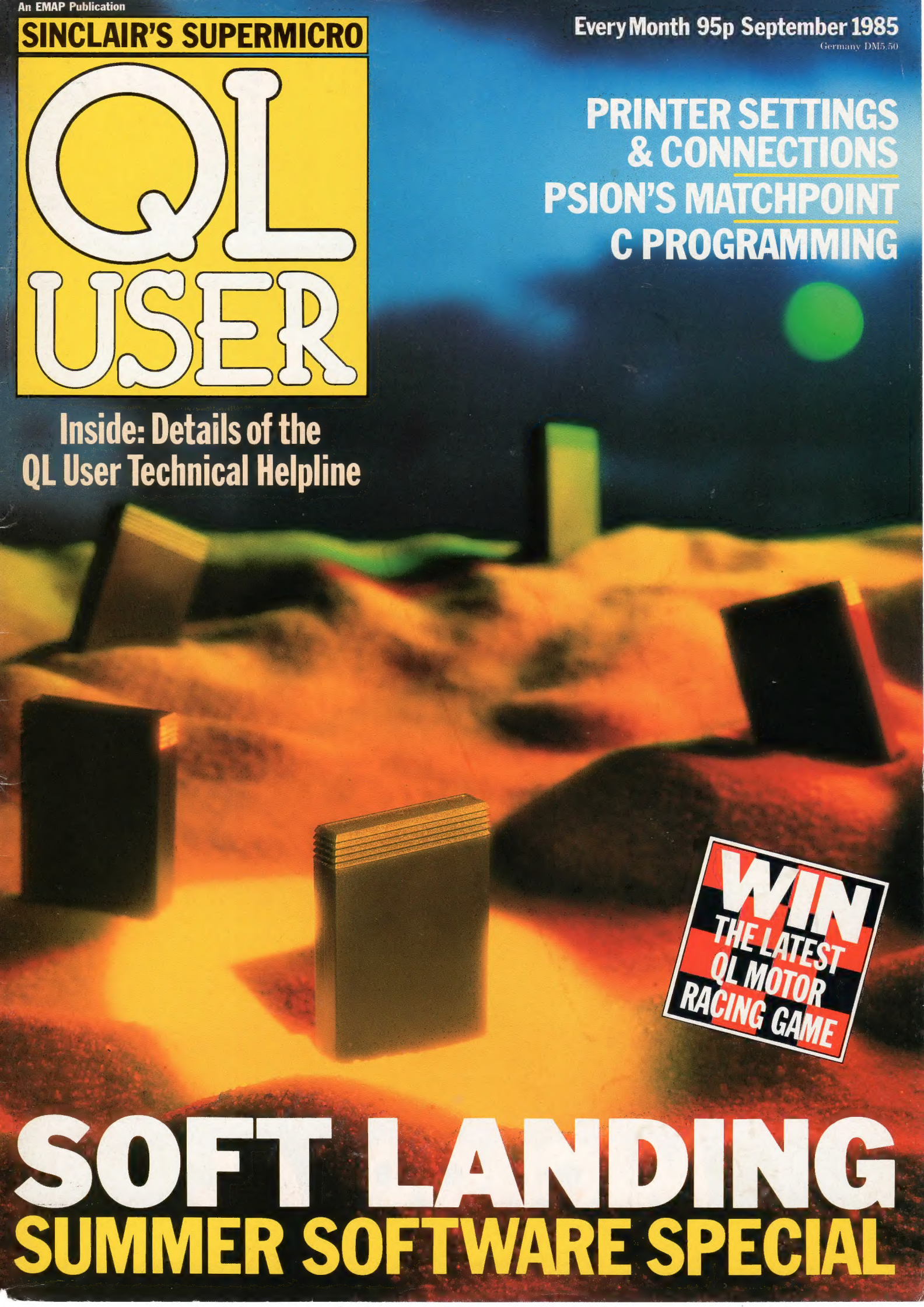
Every Month 95p September 1985
Germany DM5.50

PRINTER SETTINGS & CONNECTIONS

PSION'S MATCHPOINT

C PROGRAMMING

Inside: Details of the QL User Technical Helpline



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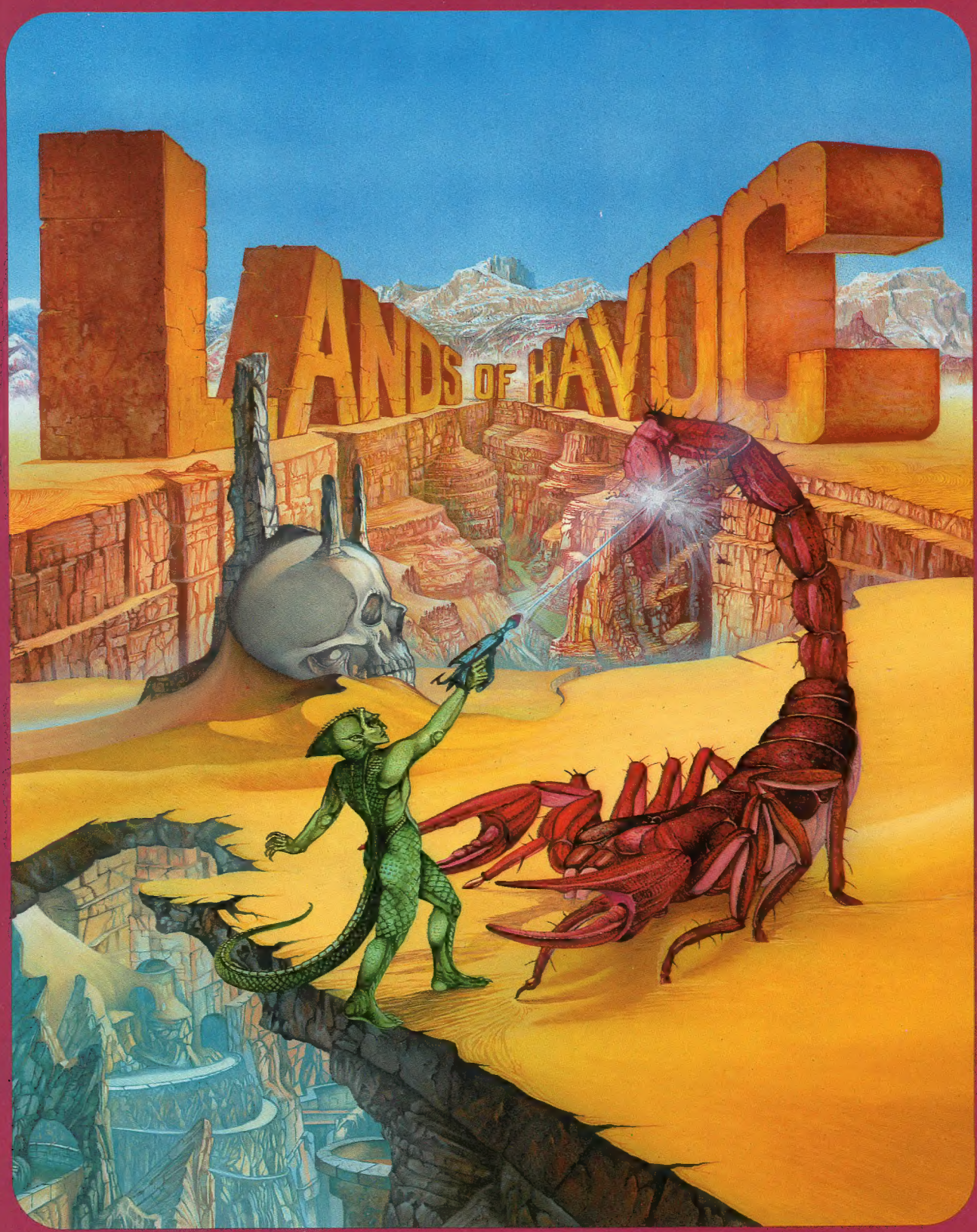
SOFT LANDING

SUMMER SOFTWARE SPECIAL

COMMODORE 64/ SINCLAIR QL

2,000 Screen Arcade Adventure



MICRODEAL

QL USER

September 1985

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Technical Helpline

Last month, it would appear we caused a considerable stir when we promised the provision of a special telephone helpline to enable readers to phone in with their problems about the QL.

Now, we're pleased to say that the helpline is up and running – the number is (01) 250 0350. However, before you dash to the phone there are a few conditions for using the service.

The Technical Helpline is *only* available to QL User's subscribers or registered readers (those who completed a registration card and receive the free quarterly newsletter); so if you don't subscribe, now's a good time to start (see p.42).

The Helpline cannot be accessed during working hours (it's disconnected!), so calls must be made between 5.30 in the evening and 9.30 the next morning or at weekends.

Questions must be restricted to one per call as only one question will be answered. Callers should state their name, address and subscription number, if any, (to be found on the address label sent with subscription copies) and whether they are a registered reader or not. Then their question as briefly as possible.

All questions will be processed (ie, subscription numbers and registration forms checked) on the very next working day from when they were phoned in and a reply sent out inside 48 hours after that by first class post (subscribers who are also registered readers get priority over other callers and their answers will be despatched on the same day as they are processed).

QL User,
Priory Court,
30-32 Farringdon Lane,
EC1R 3AU
Telephone 01-251 6222

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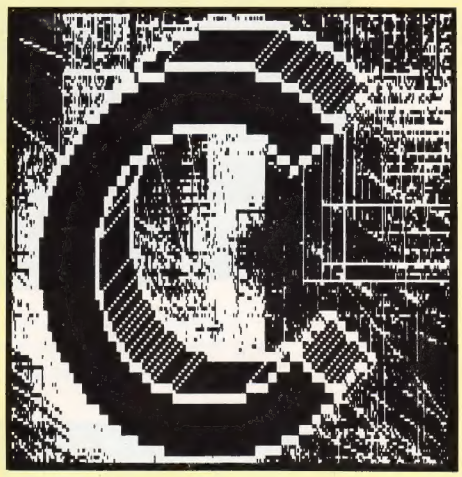
We thought it appropriate with the imminent release of Lattice-C to restart our series on programming in C.



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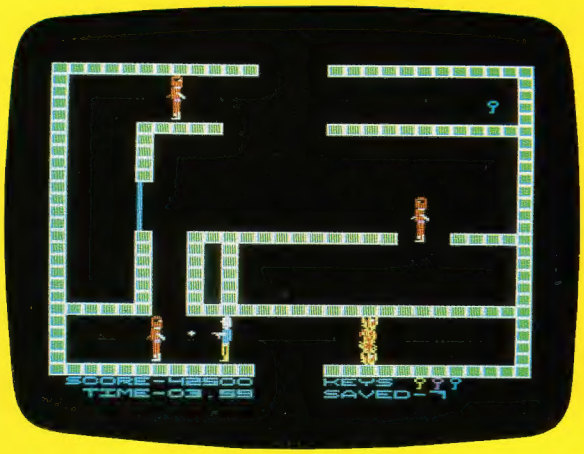
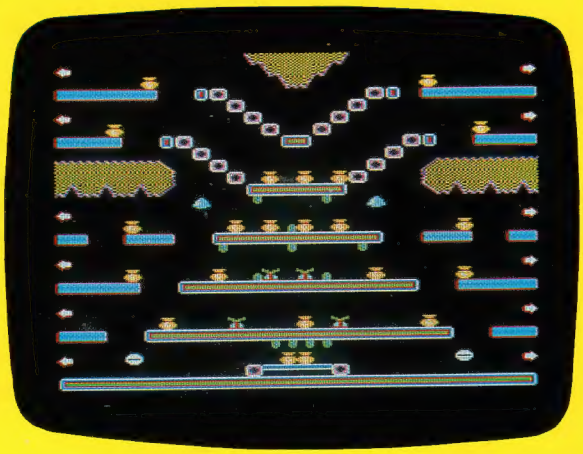
FREE!

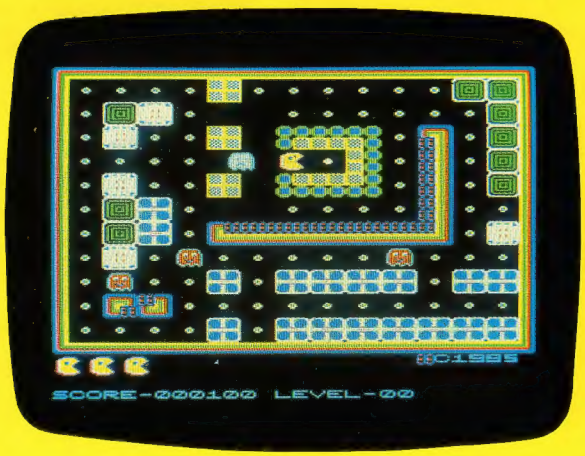
Four free games for every QL owner!



M – COSMIC. Your job is to save your friends, deep-frozen in an enemy space-ship. A mission of cool nerve and firm courage.



M – TREASURE. Deep underground there are bags of gold for you to collect – and man-eating spiders to stop and slay you.



M – CRUNCHER. Stay clear of the jaws that chase you through the maze, avoiding hazards and building points as you go.

M – METROPOLIS. Fast-moving excitement as you steer through screen after screen of incredible dangers and rich rewards.

MEDIC now offer every Sinclair QL owner four brilliant new games – absolutely free! Just send three formatted blank microdrive cartridges for these four best-ever games for the QL, testing your skill, speed and concentration with colourful screens and inventive displays.

All games 100% machine code, with flicker-free multi-colour multi-screen graphics. Three full cartridges of fast-moving instantly-responsive action.

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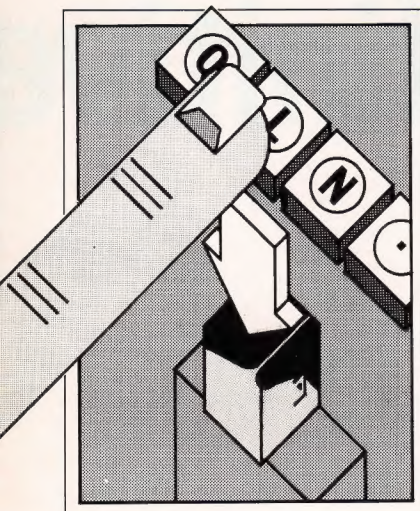
NEWS

The latest software, hardware and information on the QL product front.



Driving Force

After considerable deliberation Sinclair Research have decided to endorse MicroPeripherals 3.5" 720K disk system (benchmarked June issue). At a recent get together of peripheral manufacturers and software houses, Jeremy Brown, Sinclair's QL product manager indicated that badging the system represented an important step towards creating a common hardware standard for manufacturers to follow.

Interestingly, MicroPeripherals' disk interface stands out as one of the few not entirely designed by Tony Tebby, author of QDOS. With regard to Sinclair's choice he remarked that he was 'not surprised' but was 'a little disappointed.'

The announcement of the QL disk drive coincides with a concerted effort by Sinclair to actively defend the prefix 'QL' as a registered trademark important 'in maintaining the high reputation of the Sinclair QL product range'.

HyperBasic

Since their announcement of a SuperBasic compiler, Digital Precision's phones have not stopped ringing.

As Freddy Vachha, the company's chief executive, remarks: 'The response has been overwhelming'.

Scheduled for release on or before August 31st, the two pass compiler will produce fully relocatable code and will 'really multitask, unlike the demo routines given by Sinclair, which are in fact one program simply doing two things at once.' All SuperBasic commands will be supported except those exclusive to the interpreter such as LIST or RENUMBER. Additionally, users will have the choice of whether to optimise lines with regard to space or time. Programs will be 50% to 75% shorter and EXECute up to 150 times faster (using integer loops).

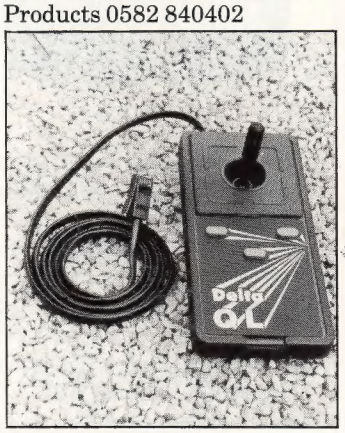
The compiler, for which Vachha is not denying having paid an advance well into five figures, was written entirely in SuperBasic. Interestingly, its first task was to compile itself. To begin with it will be available on microdrive cartridge, though an EPROM update is being considered. Prices have not yet been finalised as Vachha is undecided as to whether to go for the mass market or appeal to specialist software houses.

QL Extras

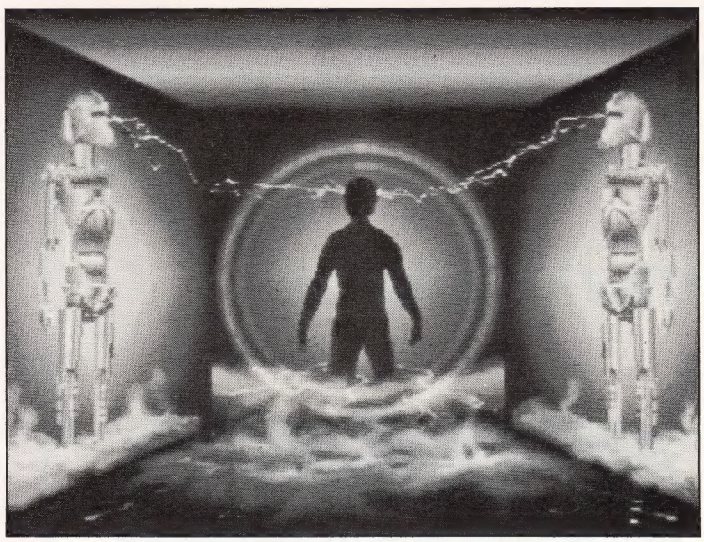
Not surprisingly, as more arcade games appear for the QL more dedicated joysticks are putting in an appearance. The latest comes from Voltmace and is known as the Delta 3SQ. This is a switched joystick, sprung return to centre, designed to be hand held and fitted with three fire buttons (presumably for those with three thumbs).

Another QL goodie comes from DRK Products. If you regularly rack your brains trying to remember where a particular microdrive is – then their Micro-Rack allows you to store them inches away from the QL's keyboard. The only problem comes when trying to fit your dust cover. However, as the rack will fit most straight edges you could always glue it to your disk drive, monitor, expansion board or whatever.

Delta 3SQ £12.00 from Voltmace Ltd 0462 984410
Micro-Rack £4.95 from DRK Products 0582 840402



The Delta joystick from Voltmace.



Here's MUD in your eye!?

Gamesmanship

For a machine originally intended for small business use the QL seems to be attracting a disproportionate amount of games software.

Psion, with two excellent simulations (Chess and Tennis) under their belt, appear to be working upon a third. This we understand will be a flight simulator on a par with, if not better than Sub-Logic's bestseller on the IBM PC. The bad news is that the first versions are intended for the Atari ST 520.

Sinclair themselves have recently bought the rights to an asteroids type game designed by I G Williams and Steve Holliday, authors of our recent games programming series.

Elsewhere, the ubiquitous Janko Mrsic-Flogel of *QL Cavern* fame has let slip that having completed four programs for Medic Datasystems, he is turning his attention to creating the equivalent of Ultimate's enormously popular *Knightlore* arcade adventure on the QL.

Finally, for something completely different. The PCW Show (Olympia, 4th-8th September) will see the launch of MUD. The fruit of some 50,000 hours of programming spread over 5 years, MUD is a giant multi-user dungeons and dragons adventure that runs off a VAX 750 computer and will support over 100 players logging on simultaneously. QL owners will be able to access it using either QCON or Brightstar modems. The game costs £20.00 to enter and £2.00 per hour to play, excluding telephone charges. For further details ring 01-608 1173.

EPROM Programmer

EPROMs are fast finding favour on the QL scene. Programs stored on them 'load' instantly, execute faster but most important of all are very much harder to pirate than cartridge based software.

So, if you have devoted countless man-hours to developing the ultimate program and now wish to protect it, then look no further than Portsmouth based Anglo Services Ltd. Their programmer board will permit object code to be easily transferred from microdrive to a variety of 4K or 8K EPROMs. The board plugs into the QL's main expansion port, requires no external power supply and costs £87.50. For further details ring 0705 671421.

Sinclair Succession

The new chief executive at Sinclair Research will be Bill Jeffrey. Previously managing director of the company's TV and communications division, Jeffrey, aged 40, joined Sinclair in March from Mars Electronics, where he was responsible for world-wide sales, marketing and R & D for the company's radar and navigational aids.

MEDIC. The Definitive

NOW–what the Macintosh does in monochrome – the QL does in colour!

M-PAINT — an amazing new program from MEDIC gives you total freedom to draw, design, sketch or paint. You can create any image, from a freehand scribble to flowcharts and technical drawings. Thousands of different effects, stipples, shadings, using a full palette of options, cursor-key or mouse-driven. Runs on the standard (unexpanded) Sinclair QL. Easy permanent print-outs. M-PAINT brings you complete design freedom – in brilliant colour. Order your copy now for immediate delivery.

New M-Paint from Medic
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Please send me ☐ copies M-PAINT colour graphics program on microdrive at £30.00 ea. inc. VAT, plus £1.00 p&p.
I enclose cheque/PO. value £ ..... (add £1.00 for p&p, irrespective of number of programs ordered).

NAME .....

ADDRESS .....

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MEDIC offer you immediate delivery of a complete expansion system for your QL. Choose the amount of extra memory you need, plus options of disk interface with parallel port and printer spooler, and modem – all contained simultaneously inside the MEDIC single-unit systemcartridge.

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Extra memory, for speed and easier program and file handling, starts at £169.95. Complete systems, consisting of 1Mb disk drive, disk interface, parallel port, integral power supply and all cables, from £249.95. Even higher performance can be achieved by adding extra MEDIC memory to your disk system, utilising RAM-disk procedures available with MEDIC free software.

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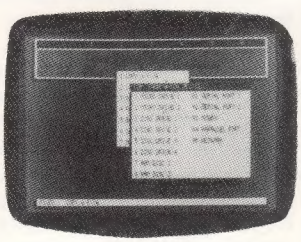
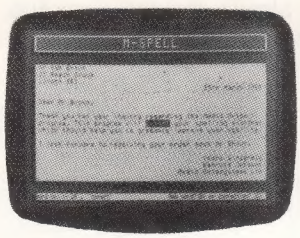
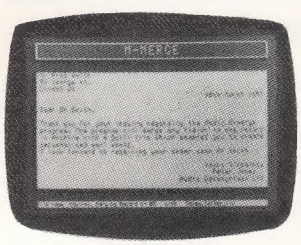


M-DESK

M-TRANSFER



M-SPELL



M-MERGE

M-DESK Macintosh-type single-key depression user interface, for instant program switching and utilities selection **M-BASE** turns Archive into a menu-driven database with single-key commands **M-ACCOUNTS** fully integrated sales, purchase, nominal ledgers, and stock control **M-KEY** single-key entry of user-defined text in any program **M-SPELL** spelling checker **M-MERGE** personalised mailshots **M-SQUEEZE** file compression **M-BOOT** sets up RAM disks in memory then automatically loads pre-defined files and programs **M-TRANSFER** microdrive – disk routine.

QL Expansion System.

QL User, August 1985:
"Medic have set out to manufacture the definitive expansion system and have, to a large extent, succeeded."

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Stand 1717, PCW Show, Olympia, Sept 4-8.

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MEDIC systemcartridge with extra memory
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*not shipped until BT approved

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Signed _____

Name _____

Address _____

_____ Telephone _____

Please write clearly

SUMMER SOFTWARE SURVEY

Whether you need mental stimulation or a bit of fun, we provide a comprehensive survey of all that's around on the QL software scene.

The QL has been with us for well over a year now and all major teething troubles with the hardware seem to have been solved. This together with the improvements, that have been made to the microdrive cartridges themselves, has lead to a great increase in the number of software packages available. There are now well over a hundred items of software available which can roughly be divided into the following four groups: Games (arcade and intellectual), Utilities (programming languages and development aids), Business, and Interests (including hobbies and educational aids). These groups, however, are not necessarily discrete.

The games fall into the two groups mentioned above. Sadly, quite a few are of extremely poor quality but sell for some quite astonishing prices. For example, there are some 4K games, written in SuperBasic which sell for around £10. However, now that some high quality machine code games are available these short pathetic efforts are beginning to disappear.

'There are now well over a hundred items of software covering games, utilities, business and hobbies'

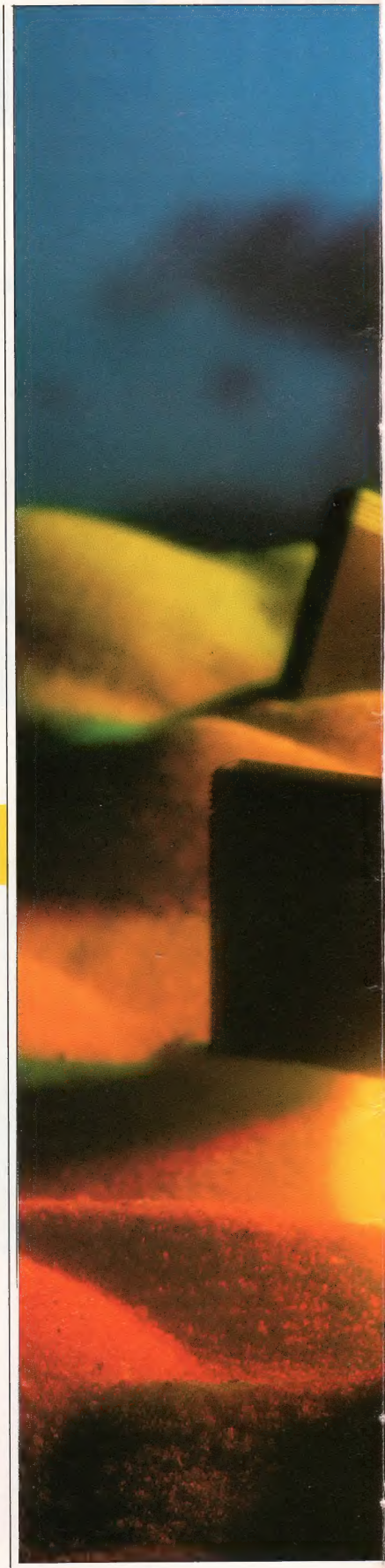
Talent was one of the first companies on the QL games scene with two excellent text only adventure games *The Lost Kingdom of Zkul* and *West*. On loading, the adventurer is treated to the most detailed loading screens yet seen on the QL, and considering that they were both released some ten months ago this is no mean feat. These were produced using Talent's own graphics screen design program, *GraphiQL* (see the business section) and have no doubt lead to increased sales of that product. Both adventures produce long, detailed, and imaginative descriptions of the many locations and feature a unique note pad facility. This note pad allows the user to store, via the use of a simple text editor, any notes about the adventure. *West* is set out in the desert wilderness, complete with all the things that one would 'expect' to find in a desert, ie, Indians, wooden shacks, tumbleweed, vultures, snakes, and of course cacti. Numerous objects are scattered about the desert and their locations vary from adventure to adventure. However, when you die (which seems a very easy thing to do) you have the option to be reincarnated and any objects that you have collected are left lying around your body so that it's not necessary to start again completely from scratch. *Zkul* is a more traditional adventure, set in the futuristic world of *Dungeons and Dragons*, complete with wizards, dwarves, complex tangles of tunnels, numerous caverns, and wonderful treasures.

Several other adventures do exist and these include *Westmonster Palace* at £8.95 from C Thomson and *Fantasia Adventure* from SB Software. Both of these are written in SuperBasic and hence take ages to load. However, *Westmonster* does have a good 3D graphic display which gives it a kind of monster maze feel but lacks greatly in content and soon gets tedious. On the other hand *Fantasia* proves an interesting challenge with plenty of objects to find and riddles to solve. The screen display is divided into a number of windows which display various details of the game and prevent text from simply scrolling off the top of the screen. Even the basic program itself is coded so that the various secrets of this adventure can't be revealed by breaking in and listening. *D-Day* from Games Workshop is a graphic strategy war game and is supplied on two cartridges. The game comes complete with four scenarios, two of which are based on the Normandy Campaign and the other two are about the taking of the Arnhem bridge. The game gives the option to play against another player or a computer controlled side. The number of forces that each side starts off with can be set to 15 or 50. It is a shame that each side can't start off with a different number of forces as many real battles are fought between unbalanced sides and this would also enable two players of unequal abilities to play each other. Another strategy game is available from Shadow Games (formally Shadow Soft) and this is *Area Radar Controller*. ARC puts you in control of up to 69 aircraft and you have to instruct the aircraft pilots and ensure that the planes do not crash, run out of fuel etc. The game itself is completely written in SuperBasic and is very slow, with poor graphics and cannot be recommended.

'As everyone knows, the QL has one of the very best chess programs around; which is produced by Psion'

No computer software collection would be complete without a Chess program and as everybody knows the QL has one of the very best, which is produced by Psion and features a full 3D board display. *QL Chess* plays a very strong intelligent game and makes full use of the QL's processing power and is reasonable value at £19.95. Several other board games do exist and these are *Super Backgammon* from Digital Precision (an off-shoot of CP Software), *The Bridge Player* from CP Software, and *Reversi* (Othello) from SoftSchool.

Backgammon and *Bridge* seem to play reasonable games although the Bridge is a little on the slow side. However, screen layout is clear in both and would be well suited to the beginner, but of little use to the experienced player. *Reversi*, however, plays an extremely



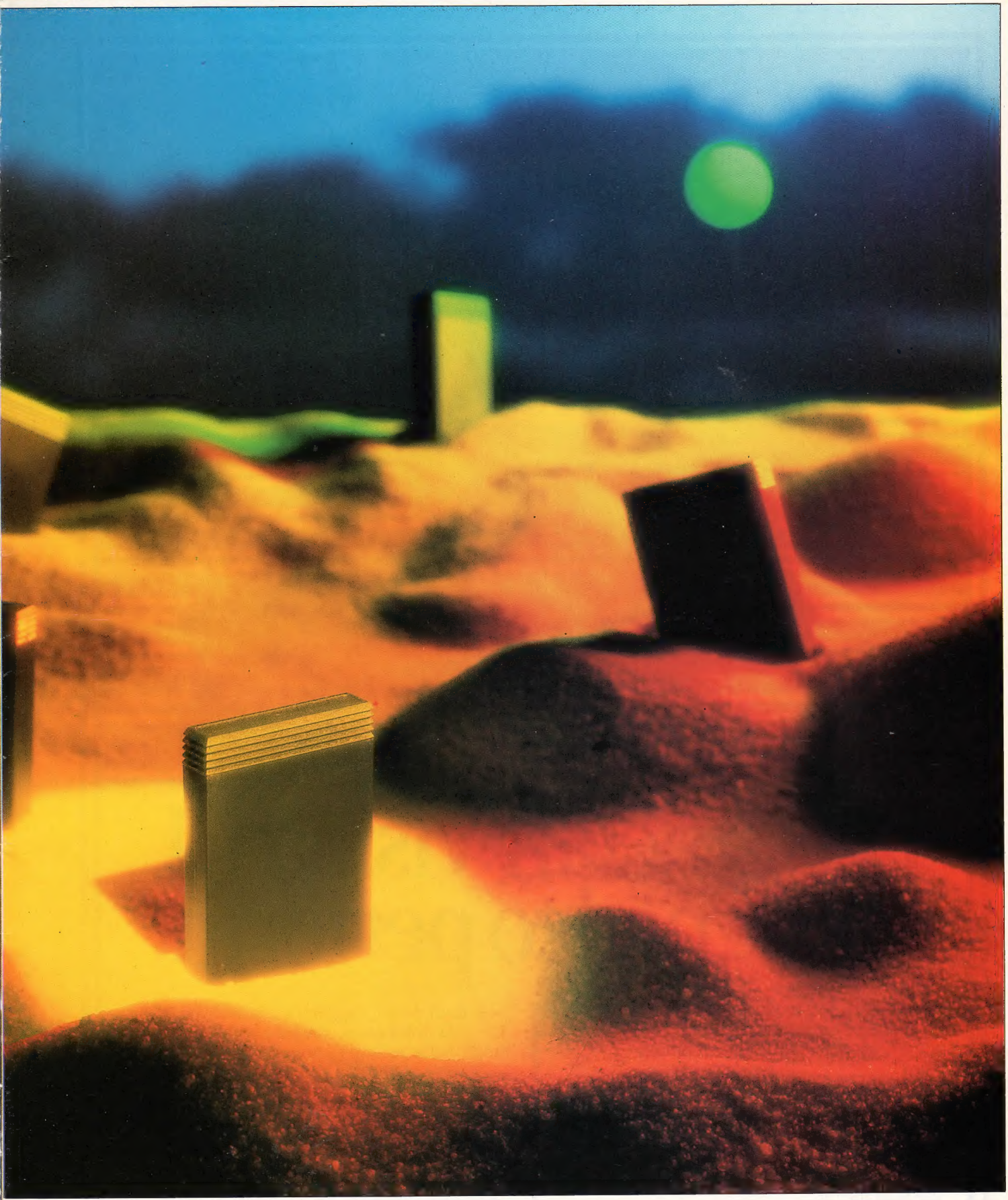


PHOTO BY TERRY BEDDIS

poor game and does not even stick to the standard rules. An example of this is that you are not forced to make a move and can pass play back to the computer. The game features eight levels of play but these levels just allow you between one and eight minutes thinking time for the whole game and when your time is up, the game just stops. Another version of Othello will soon be available on a cartridge containing *Super Forth* from Digital Precision and it is expected that this will be written in Forth. For those of you who fancy covering up your QL, a black nylon dust cover is available which comes complete with a Mastermind style game called *Colour Quest* from PP Software.

Arcade games for the QL have been a long time coming and over the last couple of months several have emerged. The quality of these games ranges from good to very poor. *QL Caverns* is a multi-screen arcade platform game and available from Sinclair at a reasonable £12.95. The game was formally called *BJ in*

The Sinclair Vision QL. Designed to perform.

For sheer good looks, superb design and high performance there is nothing to touch the Sinclair Vision QL colour monitor.

Developed in conjunction with Sinclair Research, this beautifully compact unit with its 12″ non-glare tube, 85 column text display and high resolution colour graphics is the perfect partner to the Sinclair QL computer. Comes complete with lead and connector for instant use with the QL.

Take a closer look and you'll see that it also represents amazing value for money.

You'll find the brilliant Sinclair Vision QL at your local dealer, supplied exclusively by DDL. The data distribution company with a product range that is second to none.

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THE NEW FORCE IN DISTRIBUTION

SUMMER SOFTWARE SURVEY

Space but for some reason Sinclair changed the name just before release. The object of the game is to help BJ collect 395 diamonds from the fifty different screens. The screens are detailed and contain a large number of hazards to help or hinder your tasks. Extra lives can be found just lying around in the form of red hearts, and one screen even contains nine hearts. All of these extra lives will be needed if you are going to complete this massive *Jet Set Willy* clone. However, there is more to this game than walking along platforms and collecting flashing objects. To complete several of the screens you will need to find a jetpack which enables you to leave the safety of the ground and venture into the upper heights of the caverns.

'Arcade games for the QL have been a long time coming, but now several examples have emerged'

The strangely named *EVA* from Westway is another game which features a jetpack and this is similar to Ultimate Play The Game's *Jetpak* which is available for several other micros. The object of the game is to collect several parts of a rocket and build it whilst avoiding moving nasties of various shapes, sizes, and intelligences. Despite its similarities, *EVA* features some detailed, large, multi-coloured, animated sprites and proves that an old game can be taken and transported onto the QL to live again in an improved form.

Shadow Games have also produced several arcade games and these are *Star Guard* and *Galactic Invaders* at £14.95 (both of the same cartridge), *Night Nurse*, *Quazimodo*, and *Space Paranoids* (all £12.95 each).

All six games would have been welcomed as a passable first attempt from programmers inexperienced in 68000 code when the QL was first launched. But alas, a year too late, they have been totally eclipsed by the faster, smoother scrolling and very much more demanding games from other sources. *Galactic Invaders* is the QL version of the arcade classic that spawned the video game industry some four years ago. Boring and predictable the game is hopelessly long in the tooth. *Space Guard* involves getting aliens in your sights before they home in on your cells – whilst the idea may be novel its implementation is puerile. *Paranoids* which features lemming-like invaders all trying their damnedest to crash into you. It provides a hard challenge, though once more the game owes its origins to *Arcadia*, another ageing classic from the pre-dawn of micro-gaming. *Quazimodo* is your standard Hunchback of Notre Dame game, where swinging from the belfries you cast yourself down from the parapets. It requires split second timing but is a little thin on screens (15) as well as imagination. *Night Nurse* has all the appeal of a 50p peep show. Aside from being flagrantly sexist, it is wholly undemanding and dreadfully slow. Why waste microdrive tapes when 8mm film will do just as well?

Collector from New Horizons Software is a rather simple game which is written in SuperBasic. The player just has to collect several crystals from within a small playing area, whilst avoiding stationary objects, within a certain time limit. Sadly it's a waste of time and money.

Moving up from the 68000's little sister, the 6809 are Microdeal who have just released three games *Hopper* £14.95, *Cuthbert In Space* £14.95, and *Lands of Havoc* £19.95. All three have been written by Steve Bak and are the first QL games to be marketed by a large, professional software house. *Hopper* is a version of the arcade classic *Frogger* and features some very busy road and water traffic. It is easily as good as any other *Frogger* game around, except for the one on the Mac.

Cuthbert is aimed at the younger games player and like all of the Microdeal games features some amazingly fast graphics, which are multi-coloured and animated. Cuthbert flies around in space and has to collect objects and return them to his space shuttle. He also has to control repairs that are made to the shuttle between screens. *Lands of Havoc* is a massive 2000 screen arcade adventure which is supplied with nine full colour maps and must be set to become the first QL classic. The object of *Havoc* is unclear but it seems that the player must visit around 200 locations in the correct order to win. This may seem very difficult at first but when each location is found several clues are given to the whereabouts of the next few.

Blain, Equate, Rodent, Snowsoft, Summit, and Swansoft are all fairly small companies producing games of various qualities which range from adventure to arcade. The best policy here is to see the game in action.

The QL has always been well supported with numerous utilities and languages, and now it has the widest range of professional languages available on any £400 micro. Also, the full power of its mutitasking is now beginning to be mastered and several of the programs below make perfect use of this.

68000 Assemblers are available from Adder, Computer One, GST Computer Systems, Metacomco, and TDI. Prices range from £30 upwards. No two products are the same and choosing the 'right' one is very much a matter of individual preference, my choice is the one from GST marketed by Sinclair. The main reason for this is that it's fast and does not rely heavily on the microdrives. However, the Metacomco one is the most popular and was the first on the market. Both Computer One and Adder are particularly suited to the beginner. The former for its Editor, favoured by Strathclyde University and the latter because of its user friendliness and speed. Small programs can be written, compiled and executed without a single microdrive access.

'Small programs can be written, compiled and executed without a single microdrive access'

Of course, no Assembly language programmer's kit can be complete without a dissassembler/monitor and again several are available for the QL. Hisoft, Computer One, QJump (via Sinclair), and Digital Precision all market similar products. Hisoft's *MonQL* was the first out and is the best for debugging extensions to SuperBasic, otherwise the latest version of Computer One's *Monitor* streaks ahead for sheer power and versatility though its display is a little cluttered. Digital Precision's is very simple and can amost be labelled as a toy. As I have only seen a very early version of QJump's it would not be fair for me to comment but it does look promising.

High-level languages are also a strong point on the QL. The frontrunner here is Metacomco whose *Pascal* has won considerable critical acclaim. The language compiles down to 68000 native code so that programs can make full use of the QL's multitasking capability. Also, as it conforms with ISO 7185 – the international standard for Pascal – it is ideal for those wishing to port software across from other computers. Library functions enable the user to take advantage of the QL's unique features. In addition to *Pascal*, Metacomco produces a Lisp interpreter and BCPL compiler. The latter currently provides the only comprehensive alternative to Assembler for systems programmers.

Also in the field are Computer One with a *Forth-83* compiler and P-code's *Pascal* package. The latter does not produce 68000 native code outright but is available with a run time module which permits stand-alone programs to be produced and marketed. A further two P-code packages (UCSD *Pascal* and *Fortran 77*) are available from TDI. Priced at £99.95, the former is a full UCSD implementation and is aimed at the university market where currently UCSD machines cost many thousands of pounds.

A more exotic offering comes from MicroAPL (£99.00) who have taken APL from mainframe and put it in a ROM and microdrive cartridge for the QL. The language is interpreted and comes either in its original or new keyword form. Easy to learn and use, it is aimed at mathematicians with limited computing skills.

Finally, with C currently the vogue it is surprising to learn that there is only one package on sale for the QL. GST computer system's *QC C Compiler* (£59.95) without structures, floating point arithmetic and multi-dimensional arrays is essentially an educational tool. However, new packages from Metacomco (*Lattice C*),

SUMMER SOFTWARE SURVEY

Compware (*Prospero C*) and Computer One scheduled for release this autumn all promise full Kernighan and Ritchie implementations.

All of the above languages will run on a standard QL with microdrives as supplied, however, some of the products are very large and are supplied on two microdrive cartridges and a ROM cartridge and their real powers will only be discovered by using disk drives and/or extra memory. One case where this is not true is with the Computer One products. All of these are very compact and can be used on a standard QL with ease. This makes them well suited for the beginner who just wants to try the language to find out what it's like. Most of these products will accept input from a standard screen editor and the ones supplied are very good. If, however, you don't like the one supplied then you may like to take a look at the ones available from Bedsoft, DA Bandoo, at Saltgrade Software.

SuperBasic enhancements and extensions are available in abundance for the QL. However, before you launch in with these you should appreciate that using them in programs destined for commercial use will entail some licencing fee or royalty agreement. Foremost amongst these packages are *QL Toolkit* from QJump via Sinclair (58 commands) written by Tony Tebby and *The SuperBasic Extension EPROM* from Logical Operators (70 commands). Whilst there is a certain degree of overlap between the two packages concerning job control, spooling and base conversions; *Toolkit* stands out for its full screen editor, wild card directories and powerful EX commands and SEE for its function key definer and true windowing facilities. Both packages are quite complex and not aimed at beginners.

PCS Utilities is a complete set of SuperBasic procedures aimed at the BASIC programmer. All of them are fairly simple, easy to use and should be of use to anyone writing in SuperBasic. PCS are also known to be working on two new Utilities that should be welcomed by all. They are a SuperBasic multitasker, which will multitask up to 15 different BASIC programs, and a SuperBasic multitasking compiler, which will compile BASIC programs into multitasking machine code routines. Utilities similar to those from PCS, but this time in machine code, are available from Data Management. *WD Utilities* from WD Software is again a set of SuperBasic procedures which is available on both microdrive and CST disk formats. These are all file manipulation routines which allow large directories to be viewed on the screen in one go, together with the options to Load, Print, Copy, or Delete entries via a single key press. Compware also market a similar product to the one from WD which is again written in SuperBasic. It is ambiguously named *Superficial Operating System* and claims to provide a true UNIX style directory structure and a host of other useful features for disk users.

'Several products are now available which allow you to patch files and recover corrupted data'

Microdrives, as mentioned earlier, now seem to be operating as well as can be expected, but it is still all too easy for data to become corrupted or accidentally deleted. Now several products are available which will allow you to patch files and recover deleted or corrupted data. Talent and Adder both market *Doctor* programs which are very different. Talent's program uses artificial intelligence routines and incorporates a powerful rule-based decision maker. This means that it can, in *most* cases, automatically recover corrupted data and deleted files. In the cases where this is not possible the patch option can be used to directly edit the information that is held on the various sectors of the cartridge. Adder's product is far less sophisticated and is really only a sector editor. This means that it is much harder to use and a great deal of knowledge about microdrive operation is required. Adder are also currently working on a disk version of this product which should be available in the near future. Compware produce a set of 'Microdrive Subroutines' which allow you to read and write sectors from and to cartridges via BASIC and for machine code experts the source code is available.

Hard copies of the whole or part of the QL's screen can be made by using *Tascopy* from Tasman Software or, for Epson printers only, *Screen Dump* from Lotus Soft. Both programs produce simulated colour copies and of the two, *Tascopy* is the more flexible.

Super Sprite Generator from Digital Precision allows multi-coloured animated sprites to be created and moved around using extensions to SuperBasic. The ideas behind the product are very good but they have not been implemented well at all. An example of this is that an instruction from SuperBasic is required everytime a sprite is to be moved. Programs produced using this package can be marketed without restriction and a great deal of information about including the sprite routines within your own 68000 machine code program is given.

KeyDefine from Psientific Software is a complete package of routines which enables users to define 41 function keys. Up to 2048 characters can be placed on each key and these can be used from within other programs such as Quill. Sets of defined keys come supplied and these are for use in BASIC, Quill, and Editor/Assemblers. Several other useful programs are included and these are a fast microdrive cartridge copier, directory help (which allows directories to be viewed from within other programs), and several define programs which allow the device names and window positions to be changed. All pretty useful stuff, though not necessarily vital for all set-ups.

'Psion are marketing a run-time module for those interested in Archive database application programs'

Archive, Abacus, Quill, and *Easel* are easily the most well-known business programs available on the QL. Not only because they are supplied with the QL package but also because, in their version 2 format, they are greatly improved although still by no means bug free. *Quill 2.00* has trouble with documents of more than 6000 words and *Archive's* order function is quite hairy. Patches may be obtained from Psion to rectify either problem. Those wishing to market database applications using *Archive* will be pleased to know that a run-time module is available from Psion.

Several software houses are now marketing products which link into these four programs and enhance them. Quantum Mechanics and Eidersoft both produce spelling checking programs for Quill. Eidersoft also market *Archiver*, a number of programs which can be run from Archive to provide stock control, invoicing, mailing lists, address lists, general databases, and many more.

Several Diary/Time Planner programs exist and these allow you to store your diary on the QL. QSoft's *Agenda* is the easiest to use but is really only suited to the home user. On the other hand Intersoft's *Planner* has numerous facilities including automatic reminders, urgent notice boards, categories of entries (bills, birthdays etc.), automatic updating of regular entries, and a very advanced search feature. *Q-Time* is a very sophisticated package from DataGen which provides solicitors with a time logging system. The package is expected to include QL and Monitor and be intended purely for use as a time logging system.

Sagesoft's *Account's Package* (via Sinclair) is a complete integrated accounting package which consists of sales, purchase, and nominal ledgers. It is well suited to the production of company accounts and is very easy to maintain. The other accounting package *Cash Trader* (via Sinclair or Quest) is aimed more at the smaller business user and self-employed. It is still, however, a good system and perfect for people who don't require a full ledger system. If you are running a small business and using your QL to keep the accounts then it's logical to use it to pay employees as well. TR's *Payroll* can cater for up to 75 employees at a time and these can be either weekly or monthly PAYEd. These employees can be paid by cheque (on pre-printed forms) or cash (via coin analysis). This is a full payroll system which contains everything that would be expected, eg deductions, SSP pensions, loans, overtime etc.

Another accounting program which is aimed at the home market is *QL Bank Account* from Cenprime Software. This program is good as far as it goes and can deal with all your every-day banking needs including standing orders, regular payments, credits, and minimum balance. *Bank Account* can also help you comply with conditions laid down by your bank, such as minimum balances, and thus help you to avoid the dreaded bank charges. *Bank Account* does, however, lack an automatic reconciliation procedure so your statements will still have to be checked by hand against the computer's printout.

Decision Maker, *Entrepreneur*, and *Project Planner* (all from Triptych Publishing) are three programs which not only help you to solve your particular problems but also educate you in the process. *Decision Maker* helps you make decisions by creating a tree structure and then applying critical path analysis on it to find the best possible choices. Entrepreneur simulates the setting up of a business, or a particular business venture, and then produces the expected balance sheets and profit and loss accounts. A sensitivity chart can also be produced and this shows how small fluctuations can greatly affect expected profits. *Project Planner* allows you to plan and cost projects by dividing the task into smaller and smaller components. Each smaller job is then costed and a bar chart produced which shows the duration of the project and highlights parts which are flexible or crucial.

'Entrepreneur simulates setting up a business, then produces the expected balance sheets and accounts'

The QL's high quality graphic resolution has spurred many companies into producing graphic drawing programs. These range from straight loading screen designers (such as Talent's *GraphiQL*) to highly complex icon-driven design aids (such as Medic's *M-Paint*). *GraphiQL* is certainly the most difficult to use as the full screen is always used for the graphic picture. This means that all of the complex commands have to be typed in blind, and mistakes are very easily made. It would have been much better to have had a small window that could be moved around the display (so that it does not get in the way), if only to show what keys you have pressed. *M-Paint* is a full-blown colour clone of the Apple Macintosh program, *MacPaint* and is particularly easy to use. Another graphics program which is very different from these (and perhaps of greater value to the average user) is Shadow Games *Paint Master*. This program allows you, like all the rest to produce screen pictures, but has the added option to produce a basic program that will re-draw it.

The choice of graphics utility really does depend on the precise application for which it's to be used.

'The QL is still lacking in the hobbies and interests software group – only a handful of programs exist'

The QL is still lacking in this software group and only a handful of programs exist. *Astrologer* is Digital Precision's package for star gazers and produces star maps from selected positions within the years. *Morse Tutor* from WD Software is a conversion of their popular Spectrum program, which can produce single characters, user defined messages, and a whole series of random beeps and buzzes. Speed, spacing and pitch can all be varied and the program can take you up to amateur radio level. WD also produce a *QL Reference List* which contains 500 useful references in an Archive file. This is really just an index of QL articles which have appeared in the computing press but could prove very useful if you need to find something obscure.

For those of you who feel that your keyboard speed is letting you down, Computer One's *Typing Tutor* should help you on your way. It features a number of tests and exercises which are followed by a speed and accuracy score. Perhaps a little late to catch the summer exams are Paddy Software with their program *Q REVision*. This is a core program which will load in data for any revision subject. At the time of writing only Physics is available but Chemistry and History are under development. The program forces students to revise in a structured manner by allowing them to zoom in on a particular section of the course (ie, diffraction of light could be selected via waves). Flite Software also produce educational programs including a mathematical program *Equate*.

LIST OF SUPPLIERS

GAMES

Talent The Lost Kingdom of Zkul, West £19.95 each

C Thompson Westmonster Palace £8.95

SB Software Fantasia Adventure

Games Workshop D-Day £24.95

Shadow Games Area Radar Controller £12.95, Star Guard, Galactic Invaders £14.95, Night Nurse, Quazimodo, Space Paranoids £12.95

Psion QL Chess £19.95

Digital Precision Super Backgammon £15.95, Forth

CP Software The Bridge Player

Soft School Reversi

PP Software Colour Quest £5.95

Sinclair Research QL Caverns £12.95

Westway EVA £10.95

New Horizons Software Collector £10.00

Microdeal Hopper, Cuthbert In Space £14.95 each, Lands of Havoc £19.95

INTERESTS & HOBBIES

Digital Precision Astrologer (price unavailable)

WD Software Morse Tutor (QL Reference List)

Computer One Typing Tutor £19.95

Paddy Software Q REVision

Flite Software Equate

BUSINESS

Psion Archive, Quill, Abacus & Easel, free with QL

Quantum Mechanics QSpell

Eidersoft QSpell £19.95, Archiver £16.95

QSoft Agenda £19.95

Intersoft Planner

Datagen Q-Time

Sagesoft (Sinclair Research) Integrated Accounts Package £89.95

Quest (Sinclair Research) Cash Trader £69.95, Decision Maker, Entrepreneur, Project Planner £39.95 each

TR Computer Systems Payroll

Cenprime Software QL Bank Account

Talent GraphiQL £34.95

Medic M-Paint £30.00

Shadow Games Paint Master £14.95

UTILITIES

Adder Assembler £34.95, QDoctor £14.95

Computer One Assembler £29.95, Monitor £24.95, Forth £39.95, P-Code Pascal £39.95 (C, approx £60 when released)

GST Assembler £39.95, QC C Compiler £59.95

Computer Systems Assembler

Metacomco Assembler £39.95, Pascal £89.95, LISP Interpreter £59.95, BCPL Compiler £59.95 (Lattice C £89.95 when released)

TDI Assembler £49.95 (excl P System), USCD Pascal, Fortran 77 £99.95 each

HiSoft MonQL £19.95

QJump QL Monitor, QL Toolkit £24.95

MicroAPL APL £99.00

Compware Prospero C

Bedsoft Screen Editor

DA Bandoo Screen Editor

Saltgrade Software Screen Editor

Logical Operators The SuperBasic Extension EPROM £29.95

PCS PCS Utilities

WD Software WD Utilities mdv £7.50, 5.25" disk £10.00

Compware Superficial Operating System

Talent Cartridge Doctor £14.95

Tasman Software Tascopy

Lotus Soft Screen Dump

Digital Precision Super Sprite Generator £24.95

Psientific Software Key Define

HYPER-GRID

25 Hyperdrive motor racing games from English Software to be won

PLUS

A free subscription to QL User and all our microdrive exchange software to the overall winner

English Software's *Hyperdrive* is a fast and furious racing game in which you start at the back and have to drive towards first position within a time limit. There are five sections to the course and you must be within the top five to move on.

Each section of the course is presented in high resolution 3D graphics (the other cars come out of the screen towards you, giving a pretty convincing illusion of overtaking and acceleration).

Controls are straightforward and easy to use, with the screen display indicating changing position and amount of time left. This makes Hyperdrive exhilarating and addictive as well as a challenge.

TO ENTER: To make a change from our usual competitions this one's extra hard (!).

Study the cryptic clues below. Each one refers to a word which when placed in the Hyperdrive Wordgrid will read from top to bottom and fit in with the letters of the word HYPERDRIVE. We've done one for you – the word GRAPHICS – though we're not saying which clue it solves.

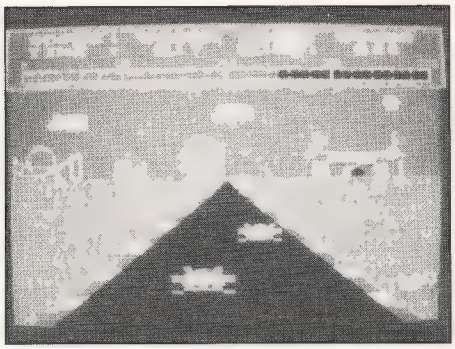
So, you have ten clues and nine words to find (after eliminating the clue for the word GRAPHICS). Once you've found all the missing words (they're all computing terms and some are specific to the QL), just write them into the grid and you could be one of our 25 winners.

In addition to this, *QL User* is offering an extra prize of one year's free subscription to the magazine and all the programs currently on the microdrive exchange, to anyone (see rules) who can solve the second part of the competition.

Hidden within the grid is another 10 letter word, which like Hyperdrive will read horizontally – one letter from each vertical word. However, the letters of *this* word are not in the correct order and must therefore be reordered to solve the puzzle.

And the only clues we're giving for the solution of this second part of the competition is that the word is fundamental to computing and each letter it contains is different.

To summarise, then, the competition is in two parts. The first requires completion of the Hyperdrive Wordgrid by solving the clues and eliminating the word already entered. The second presumes a correct and complete wordgrid from which 10 letters are extracted (one letter from each vertical word), all different.



These 10 letters form an anagram of another 10 letter word which matches the clue given above.

RULES: All entries must be written on the panel provided on this page, which must then be stuck onto a postcard. Any other form of entry will be disqualified.

Entries must be sent by post only (no hand delivered entries will be accepted) to the following address: **HYPER-GRID, QL User, Priory Court, 30-32 Farringdon Lane, EC1R 3AU.**

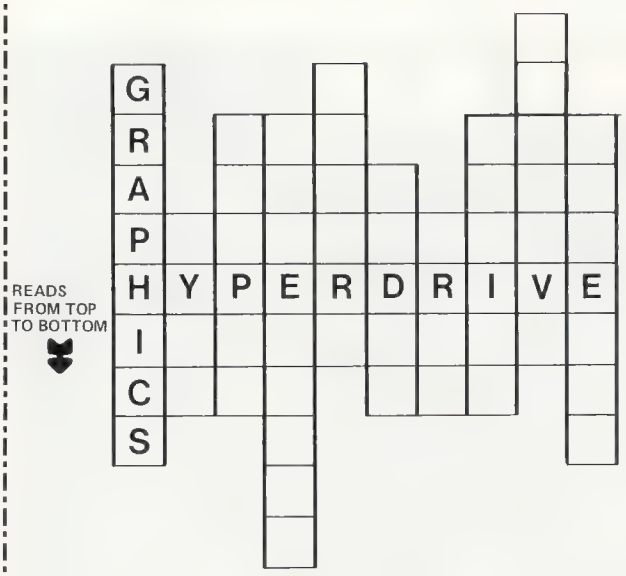
To qualify for one of the 25 Hyperdrive games, every letter within the grid must be correct. Those that meet this requirement will then also qualify for part two of the competition. Prior to that, however, the 25 Hyperdrive winners will be chosen from out of the hat. These 25 and any other qualifiers will then be judged for their solution to part two. Any correct entries for part two will go into a hat for the overall winner to be chosen (the entry chosen need not have been selected previously as a *winner* of a Hyperdrive game).

CLOSING DATE: All entries must be received within the *QL User* office (ie, nowhere else within the Priory Court building), on or before **20th September, 1985** (normal post takes up to two days to reach our office *after* delivery).

JUDGING: All entries will be judged by the Editor of *QL User* according to the above rules. Any decisions regarding the part one and part two winners are final and no correspondence will be entered into regarding them. Winners will be notified through the pages of the magazine and their prizes sent shortly afterwards. The overall winner will be notified separately.

No employees of EMAP and its associate companies, nor any of their families or the families and staff of The English Software Company may enter this competition.

CUT HERE



Solution to anagram

NAME _____

ADDRESS _____

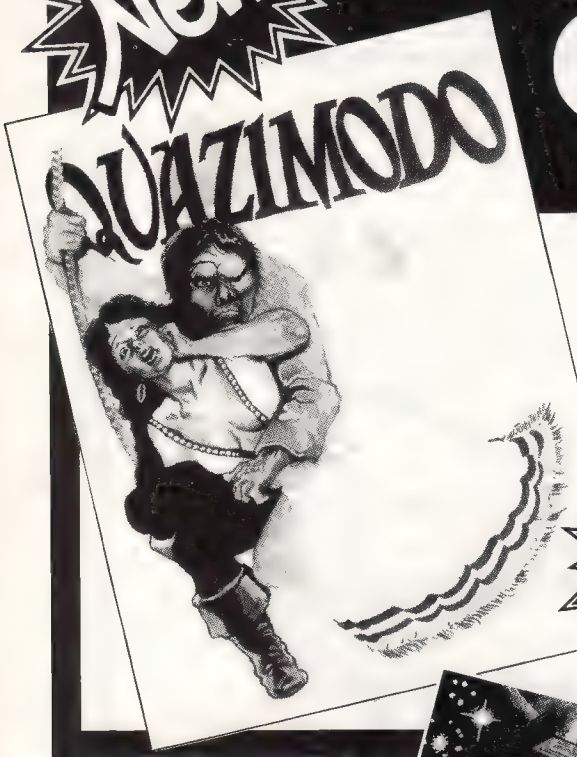
CLUES

Evoke same if split and swapped
Initialise high-flying store
Announce this mod emphatically
Can it be real? Never!
Construct and join with R
Grid and chips
DB makes Eva rich
Eat it by tea time
Working, semantic and episodic. . .
A reformed character?

NEW

SINCLAIR **QL** SOFTWARE BY

SHADOW GAMES



QUAZIMODO

Help our hero rescue Esmerelda. He must jump the battlements and avoid soldiers, rocks, arrows and the mad axeman. A popular concept skilfully converted for the QL. Exceptionally smooth and detailed graphics with 15 screens of brilliant arcade action.

£12.95

And

SPACE PARANOIDS

A fast moving alien zap game with 9 different types of alien and 40 different attack waves. Joystick or keyboard. You'll keep coming back for another go.

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GALACTIC INVADERS & STAR GUARD

TWIN PACK

Unbeatable value, 2 good arcade games for the price of one. Keyboard or joystick.

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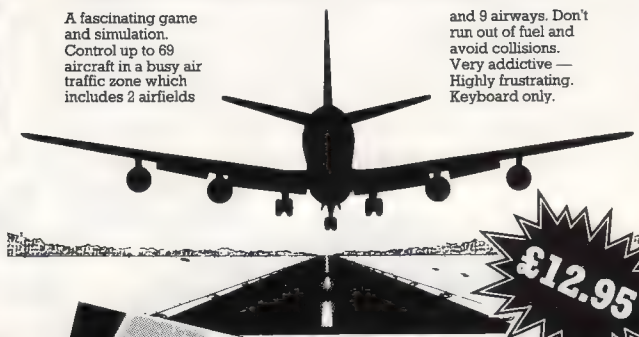
AREA RADAR CONTROLLER

A fascinating game and simulation. Control up to 69 aircraft in a busy air traffic zone which includes 2 airfields and 9 airways. Don't run out of fuel and avoid collisions. Very addictive — Highly frustrating. Keyboard only.

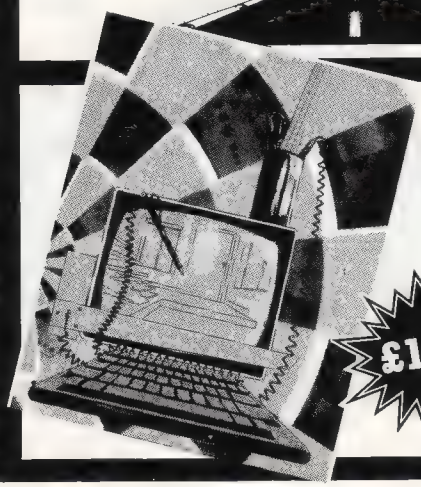


£12.95

NIGHT NURSE

An arcade adventure with extra large detailed graphics. Guide Nurse Gray around St Spooks Hospital, avoiding randy doctors and Paranoid Pete, the forensic flu bug. Pick up and use whatever objects you can find in your quest for the Golden Prescription. Keyboard or joystick

£12.95



PAINT MASTER

A Graphics Package and Mini-Adventure. Keyboard or joystick.

£14.95

QU9

Please send me the following products on microdrive cartridge for the QL:

	cost
..... Quazimodo @ **£12.95**	.....
..... Space Paranoids @ **£12.95**	.....
..... Night Nurse @ **£12.95**	.....
..... Galactic Invaders/Star Guard @ **£14.95**	.....
..... Area Radar Controller @ **£12.95**	.....
..... Paint Master @ **£14.95**	.....
TOTAL	.....

ALL PRICES INCLUDE VAT, POSTAGE & PACKING

Name .....

Address .....

.....

.....

Please make cheque or postal order payable to Shadow Games and send to:

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70 Gooseacre, Cheddington
Nr Leighton Buzzard
Beds. 0296 668740

QL PROGRAMMERS. Want someone to market your game? — send it to us for assessment; you will not be ripped off. At worst it will be returned uncopied, at best you will be offered a contract at good royalty rates.

AN IMPORTANT ANNOUNCEMENT TO ALL QL OWNERS

bad or changed medium

Your data is worth a lot to you. Source programs, text, scientific information, records, all represent hours of your time and effort. Losing a file could at worst cost you money — and it's **always** infuriating!

No storage medium is 100% reliable. That's why TALENT has developed the CARTRIDGE DOCTOR. It's a sophisticated machine code program which will, in most cases, enable you to:

- recover files from a bad medium
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It's very easy to operate and no knowledge of BASIC or machine code is required.

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SOFTWARE FROM SCOTLAND

NOW, buy a CARTRIDGE TIDY
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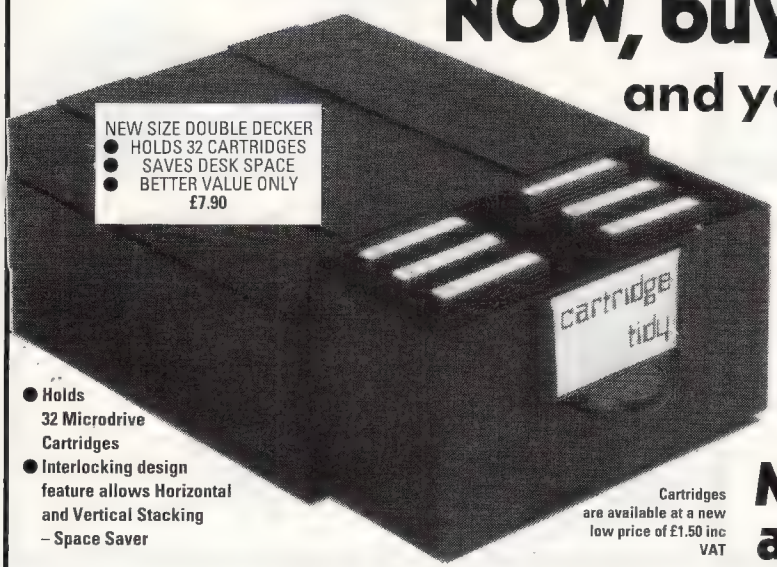

- Holds 32 Microdrive Cartridges
- Interlocking design feature allows Horizontal and Vertical Stacking – Space Saver

Cartridges are available at a new low price of £1.50 inc VAT

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Microdrive cartridges at £1.50 delivered to your door! within 24 hours

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at £7.90 each, inclusive, and ..... blank microdrive cartridges
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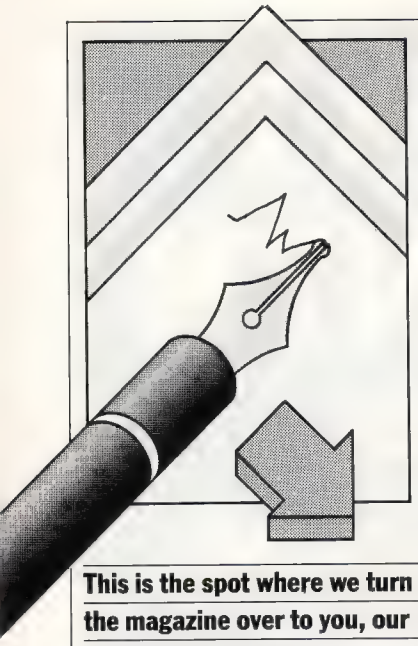

This is the spot where we turn the magazine over to you, our readers. We welcome any comments, criticisms or anecdotes about either the QL or QL User. The address to send your letters is: Open Channel, QL User, Priory Court, 30-32 Farringdon Lane, London EC1R 3AU

Cartridge Crisis

I have lost track of the number of microdrive cartridges I have had replaced by Sinclair under warranty. Sadly, the warranty period has now run out.

Since it appears that microdrive cartridges either jam or wear out quickly (one lasted three weeks), should not Sinclair emphasise the fact that they are expendable? Or is it my QL at fault?

Either way apart from moaning, is there anything QL owners can do? By the way, I cannot afford disks.

S L Hindley
Letchworth

The dreaded 'bad or changed medium' message is usually your first indication of tape wear on the QL. If you are lucky it may only result in the loss of a single file rather than the entire contents of your cartridge. Either way you will find Talent's semi-intelligent Cartridge Doctor will automatically recover most, if not all, of your corrupted data.

Prevention being better than cure, a good way of identifying potential ringers is to reformat your original cartridge – once it has been backed-up – keeping a wary eye on the number of available sectors. If these are seen to diminish rapidly you would be advised to get rid of the cartridge.

As cartridge cases are moulded, tape jams are invariably fatal, however out of the many hundreds of programs sent in to the PROGS or Microdrive Exchange only five have jammed so far. So, if this is a frequent occurrence it seems fair to assume that there is something wrong with your QL – (eg, the tape heads are out of alignment).

Stumbling Block

I believe that printers, and linking them to the QL constitute the major problem faced by individuals like myself who have limited knowledge. I would like to see much more basic information on printer installation appearing in *QL User*, together with installation progams where applicable.

L J Huston
Southport

Hopefully our feature 'Dipping In' will provide you with the answers you're looking for. The trouble with printers is that no common standards are applicable. Protocols, control codes and even the way in which information may be transmitted to them varies from one machine to another. There is no way that we can lay our hands on every printer on the market, so we need your help if we are to help you.

First, if you have a printer that hasn't been covered by us and have successfully managed to install it on the QL, scribble down the details of your Psion printer driver, of the SuperBasic command to open the serial port and details of any screen dump you are using.

Secondly, if you are having problems, when you write in enclose specific details gleaned from your printer manual concerning DIP switch settings, control codes, serial or parallel transmission, Baud rates and parity. If you don't understand what these things are yourself, don't worry! Just photocopy the relevant page or mention and send it in. With this information we can unravel the mysteries of your printer. Without it, we have to contact the manufacturers and persuade them to help us. With a few exceptions this course of action is seldom fruitful.

Beyond SuperBasic

I have owned a QL for almost a year now, and think that it's an excellent product despite all the abuse that has been hurled at it. However I am beginning to find SuperBasic limiting and would like to progress to a different and more powerful language.

As far as I can see I have two choices – Assembly language or C. Which one would be better for the beginner? Also I would like to know if C can handle I/O as well as assembler and if it is possible to add new functions to BASIC from that language – eg, screen dumps, sprites etc. Lastly, could you tell me which versions you prefer?

John Bainbridge
Faversham

C can be seen as a cross between Assembler and high level languages such as Pascal or even SuperBasic. It produces compact and efficient code yet is structured so that programs are very much easier to write. It is the obvious choice for anybody wishing to advance.

Unfortunately, C compilers for the QL are, for the time being at least, in short supply. Only one, GST's QC C compiler (£59.95), is on general release. This uses a limited subset of C, known as RatC which excludes floating arithmetic, multi-dimensional arrays and structures. A run time library is supplied which, although it does not include a routine to add new functions to SuperBasic, will allow direct access to QDOS so that it should be possible to write your own function and add it to the library. Other library routines provide extensive coverage of all aspects of the QL's operation including I/O.

Number Lumber

Further to Ray Oertzen's query in the August issue Tony Tebby has added these comments.

QDOS itself, being an operating system, does not use floating point numbers at all. The SuperBasic interpreter (and the BASIC support utilities in the ROM) handle floating point numbers to an accuracy of nine and a half digits. To prevent spurious numbers being printed, the PRINT statement in the SuperBasic interpreter will normally truncate floating point numbers to seven digits before printing. If alternative print routines are used, however, the full nine digits of a floating point number can be printed.

Cash Trader itself is written in BASIC and so will handle numbers up to ± 1,000,000.00. On entry, the values are limited to seven digits, it is true, but totals (so I am told by Sinclair) are printed with up to nine digits. Sagesoft Accounts, however, is (I believe) written in C but in any case has its own arithmetic routines of considerably greater accuracy. On entry, numbers are still limited to eight digits but totals may be printed with up to 10 digits.

I hope that at some stage the old chestnut of seven digit accuracy in the QL SuperBASIC interpreter can be laid to rest.

Sprite Design

I have owned a Sinclair QL since last Christmas, but have had a ZX Spectrum for about two and a half years. Anyway, I have heard from a few people that the QL uses sprites and not user-defined graphics, so please could you tell me how to use these sprites (from SuperBasic, if possible). For example, how would you define and put on the screen a pacman-type character?

George Bryant
Streatham

You appear to have been misinformed. The QL has neither sprites nor user-definable characters though these features can be added to it, provided you have a thorough grasp of machine code.

No need for despair, however, as in our April issue we published a set of short programs written by Richard Cross which allow you not

▶

OPEN CHANNEL

only to design sprites but also move them about the screen from within SuperBasic. If you cannot be bothered to type these in, the programs along with detailed instructions regarding their use are available from our Microdrive Exchange.

Costly Code

Some months ago we were told that QL software would be more costly than for other micros because of the high cost of microdrive cartridges. It was pointed out that at £5.00 a time, with the retailers' mark-up of 33% (or more), it was not unreasonable to pay £15.00 plus for a game. Cassettes, on the other hand, could be sold for 50p, because they cost only a few pence to the games manufacturer.

Suddenly, in February this year, prices of microdrive cartridges plummeted. And what happened to the price of commercial software? Surprise, surprise . . . nothing.

It is difficult to understand why the cost of new software coming out for the QL is so high, in comparison with that for other machines.

John Roberts
Littlehampton

Games, we admit, are not cheap but with only 60,000 QLs sold the market place is very small compared with that, say, for the Spectrum or Commodore 64. Not surprisingly then, software houses are reluctant to lower their prices even if production costs have gone down. However, as the competition gets fiercer things will doubtless change.

Also, if you look up-market at machines whose specifications more closely resemble the QL you will find that prices are very reasonable indeed by comparison. This is especially true of business and language packages. For example, Sagesoft's accounting software costs in excess of £300 on the IBM PC but is available at a third of the price on the QL – quite a saving!

Peripheral Points

I have recently bought a QL with a CUB monitor. When I've come to grips with the software, I would like to buy a modem and a printer for it. But I would like some advice on the following questions.

1. Can a modem and a printer be connected at the same time, or will I have to recable?
2. Is it possible to buy these items with cables and software included or do I have to become a technician and programmer to get them to work?
3. I want a modem with 1200/75 and 300/300 Baud and a printer with NLQ, the latter costing no more than £400. Can you recommend any please?

Alex Van Tricht
Skylite Ltd

There are two serial ports on the QL. 'Ser1' is wired up for use with a printer, 'Ser2' for use with a modem. Consequently you will have no problem connecting a printer and a modem simultaneously.

The Brighstar modem which has recently had a facelift and includes auto-dial, auto-answer as standard is ideal for your purpose. The unit is supplied with appropriate cables and some exceptional terminal software which makes its operation child's play.

As for an NLQ dot matrix printer we suggest you look at Epson's new LX-80. Along with a tractor feed and a serial to parallel interface it should just fall below your £400 limit. Aside from a minor modification to incorporate NLQ as an option on Quill (see 'Dipping In'), it will work with all Psion's packages, Easel included using existing printer drivers.

Worthy Note

Noting Ian McRobert's observation (Open Channel – July issue) on printing without the Quill cartridge in mdv1_, provided that the user cartridge contains a copy of the file PRINTER_DAT the printer will operate normally for all typeface options. The facility to have both microdrives occupied by user cartridges greatly enhances the flexibility of Quill.

NEXT MONTH

FREE

WITH THE

OCTOBER EDITION

The QL User

Owner's Manual

A specially commissioned supplement to the official Sinclair 'QL User Guide' and something that every QL owner will find indispensable, the QL User Owner's Manual is presented free with the next three issues of QL User (October, November and December). It comprises three discrete sections which combine to make the ultimate reference source for anyone owning or thinking of owning a Sinclair QL.

Designed to continue where the guide supplied with the QL leaves off, the QL User Owner's Manual has been compiled with three specific groups in mind – beginners, business users and those with some degree of technical knowledge. Everyone will find something useful in each of the three sections.

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Winchester Disk

Of immense interest to business users and those with large amounts of data to store, a well-known company in the QL peripherals market has come up with a full spec Winchester disk system. Needless to say we'll be putting it through its paces.

SuperBasic Compiler

Poised to shake up the machine code programmer's dominance of high speed programming, Digital Precision's full SuperBasic Compiler should also prove a godsend for those seeking 'list' protection for their software. We review this utility with far-reaching implications.

Spectrum Connections

Got a Spectrum? Want to know how to link it up to the QL and transfer software? Then make sure you buy next month's issue which contains a program to transfer Spectrum programs to the QL and save them onto microdrive for subsequent editing.

ALL THIS AND MORE INSIDE THE

October Edition
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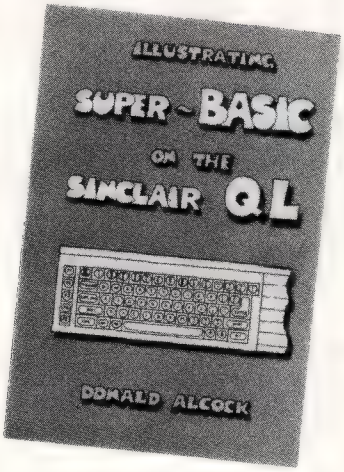
Illustrating Super-Basic on the Sinclair QL

by DONALD ALCOCK . . .



. . . introduces you to Super-Basic on this popular machine. Packed with examples and in the same unique style as the author's previous books, it explains and illustrates useful programming techniques, including graphics, state tables, list processing, sorting and recursion. The ideal companion to the Sinclair QL, this book is both a complete guide to the facilities available on this machine, and a clear reference manual for Super-Basic. **Comb-bound £5.95 net**

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e.g. for RAMpack
PORT 0
e.g. for DISC i/f

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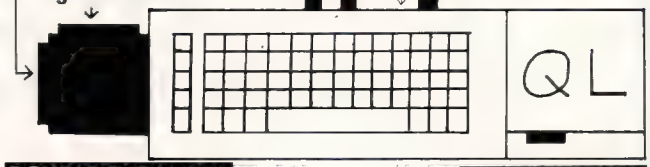

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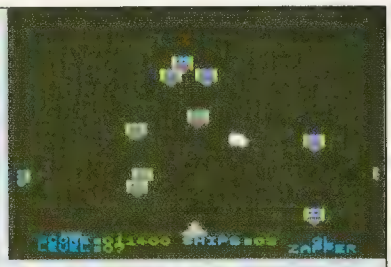

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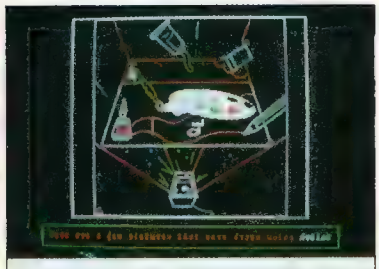

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AI ON THE QL

Understanding natural language is child's play to humans, but to a computer it's decidedly difficult – Mike James charts their efforts.

ILLUSTRATION BY PAUL ALLEN

AI ON THE QL

A central concern of AI research is the development of computer programs and hardware that possess the power of speech. Talking computers have been with us for some time and although speech synthesis isn't yet perfect it *is* cheap and usable. Even speech recognition has developed to the point where, as long as the word is spoken clearly, a small device can detect one out of a predetermined set of words in real time (ie, without any significant delay!)

In the not too distant future, perhaps next year, could machines like the QL engage us in deep and meaningful conversations? Not a chance! The amazing advances in computer hardware that have given us cheap speech have not been accompanied by any amazing advances in software to make machines understand natural language. This is more or less a general picture of the state of AI and reflects the fact that while the hardware is comparatively easy, the software is a brute of a problem.

English Rules OK!

We may be a long way from the *intelligent* computer but, as earlier parts of this series have tried to illustrate, we have already arrived at a computer that is looking moderately clever! For instance if you need a computer that can understand requests, queries and commands in a natural looking, but restricted form of English, then in many cases you will not have to wait very long.

English, like most other natural languages is capable of expressing a wide range of ideas in many different ways. Although it isn't restricted in the way that computer languages (eg, SuperBasic) are, it does obey rules that determine what is correct and what isn't.

Take the phrase *'cat mat sat on the'*. It can be recognised as a mangled version of a familiar English sentence, but it is clearly *not* English! This, obviously, is due to the order in which the words have been put together. The sentence is said to be syntactically incorrect, or more generally, it's not grammatical. Knowing the grammar of a language is an important first step in understanding it. For a rigid and restrictive language such as SuperBasic, the grammar is completely known because the language was created by defining its grammar first. For a natural language such as English, however, things are not so easy. Natural languages evolve through use and any grammar that they obey may need to be deduced by looking at several examples of correct sentences from the language. No-one to date has managed to work out the complete grammar for English. There is a way of describing about 90% of all correct English sentences, but the rest are a little tricky.

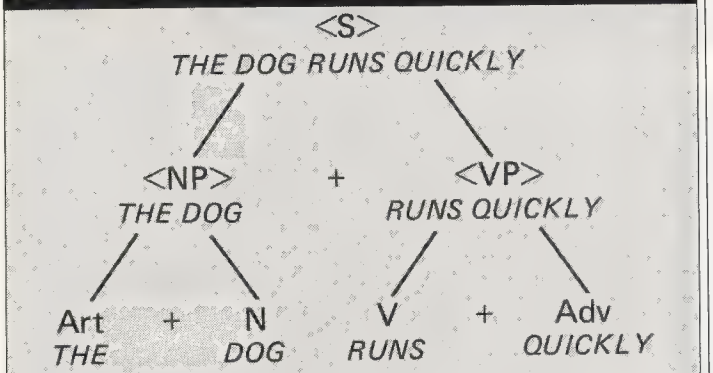
Breaking It Down

The most popular way to describe any grammar is by way of 'production rules'. For example, one category of English sentence has the form *noun phrase + verb phrase* (NP + VP). Since *'the cat'* is a noun phrase and *'sat on the mat'* is a verb phrase, it is not difficult to see that *'the cat sat*

LISTING 1

```
10 REMark Chat
20 MODE 8
30 WINDOW 452,236,60,20
40 set_vocab
50 S$=""
60 noun_phrase
70 verb_phrase
80 PRINT S$
90 STOP

1000 DEFine PROCedure set_vocab
1010 RESTORE
1020 REMark article
1030 DATA 2,"A","THE"
1040 REMark nouns
1050 DATA 4,"COMPUTER","PRINTER","PROGRAM","BUG"
1060 REMark adjectives
1070 DATA 3,"BIG","POOR","TINY"
1080 REMark verbs
1090 DATA 4,"WRITES","RUNS","DEBUGS","PRINTS"
1100 REMark adverbs
1110 DATA 3,"SLOWLY","FAST","QUICKLY"
1120 REMark prepositions
1130 DATA 3,"ON","TO","UNDER"
1140 READ art
1150 DIM a$(art,15)
1160 FOR i=1 TO art
1170  READ a$(i)
1180 END FOR i
1190 READ noun
1200 DIM n$(noun,15)
1210 FOR i=1 TO noun
1220  READ n$(i)
1230 END FOR i
1240 READ adj
1250 DIM d$(adj,15)
1260 FOR i=1 TO adj
1270  READ d$(i)
1280 END FOR i
1290 READ verb
1300 DIM v$(verb,15)
1310 FOR i=1 TO verb
1320  READ v$(i)
1330 END FOR i
1340 READ adverb
1350 DIM b$(adverb,15)
1360 FOR i=1 TO adverb
1370  READ b$(i)
1380 END FOR i
1390 READ prep
1400 DIM p$(prep,15)
1410 FOR i=1 TO prep
1420  READ p$(i)
1430 END FOR i
1440 END DEFine set_vocab

2000 DEFine PROCedure noun_phrase
2010 REMark select an article
2020 S$=S$ & " " & a$(RND(1 TO art))
2030 REMark select adjective or null
2040 IF RND>.5 THEN
2050  S$=S$ & " " & d$(RND(1 TO adj))
2060 END IF
2070 REMark select noun
2080 S$=S$ & " " & n$(RND(1 TO noun))
2090 END DEFine noun_phrase

3000 DEFine PROCedure verb_phrase
3010 REMark select a verb
3020 S$=S$ & " " & v$(RND(1 TO verb))
3030 REMark select an adverb/null
3040 IF RND>.5 THEN
3050  S$=S$ & " " & b$(RND(1 TO adverb))
3060 END IF
3070 prepositional_phrase
3080 END DEFine verb_phrase

4000 DEFine PROCedure prepositional_phrase
4010 REMark generate phrase or null
4020 IF RND>.5 THEN
4030  REMark select a preposition
4040  S$=S$ & " " & p$(RND(1 TO prep))
4050  REMark generate a noun phrase
4060  noun_phrase
4070 END IF
4080 END DEFine prepositional_phrase
```

FIG 1



Simple sentences are easily broken down into their constituent parts, beginning with Noun Phase/Verb Phase and ending with the actual words. Complications arise, however, with pairs of sentences such as JOHN IS EASY TO PLEASE and JOHN IS EAGER TO PLEASE. Here a more sophisticated model is required, along with some form of semantic analysis.

on the mat' fits this pattern. In other words, one type of allowable sentence is a noun phrase followed by a verb phrase, or S = NP + VP.

The next stage in defining this particular structure is to describe a noun phrase and a verb phrase more precisely. A noun phrase may be seen as a *noun* (N) plus an *article* (Art) – in this case, *'cat'* and *'the'* respectively – or NP = N + Art. Notice that the definition of a noun phrase is different from the definition of a sentence in that it makes reference to 'types' of words and in this sense is complete. It is usual to use angled brackets, '<' and '>' to mark out anything that occurs within a definition that has to be further defined. So, the definition of a sentence becomes <S> = <NP> + <VP> and that for a noun phrase <NP> = N + Art. Such notation can quickly begin to look complicated if you are not used to it. However, these symbolic forms are the very bones of this area of AI and prove invaluable when constructing algorithms.

Utilising these symbolic forms involves working down the list of rules until you have completely eliminated all of the angle brackets and replaced the final word types by the words themselves. For instance, given the three basic rules below you could generate *'the dog runs quickly'* in *Fig 1* (Not particularly inspired, but it makes sense).

1 <S> = <NP> + <VP>
2 <NP> = Art + N
3 <VP> = V + Adv *(verb and adverb)*

To describe rather more complicated sentences we need to introduce a few extra ideas (but not very many). A fairly obvious one is that often there's a choice between different forms (indicated) by the '|' symbol) as in <NP> = P|Art + N, where P is a pronoun (eg, 'he' or 'she').

Grammatical Generators

The method described above for generating a sentence can easily be converted into a program. All that's required is to write procedures that generate each part of the grammar. The program to produce sentences on this basis is surprisingly short *(Listing 1)*. However, it is still capable of generating sentences such as *'the poor program debugs slowly on the computer'*. The sentence is generated in the string S$ which is initialised at line 50. Each procedure adds its contribution to the right of the string. If you want to increase the program's vocabulary then all you have to do is modify the DATA statements in line 1020 to 1130. Each separate DATA statement contains a group of words of a given type; the first item being a number that indicates how many words follow. For example, line 1050 contains the list of nouns that the program will use and '4' at the start of the list indicates that there are currently four nouns.

Sense And Nonsense

The mangled version of *'the cat sat on the mat'* given earlier was not a sentence because it broke the rules of English grammar in much the same way as 'TO GO 300' breaks the rules of SuperBasic grammar. However, a sentence can be *grammatically* correct but meaningless. For example, *'the dream sleeps furiously'* is grammatically correct, but nonsense, because dreams cannot sleep and furious is not an adverb which can be applied to sleep. This kind of grammatically correct nonsense might be called 'poetry', but on the whole it is not something that we expect computers or humans to deal with.

In the same way, the language generated by our 'Chat' program *(Listing 1)* is not meaningful (even though it is grammatically correct) because the QL isn't using it to convey information.

If grammar and sense do not necessarily go together why is grammar so important in the discovery of meaning? Well, if you know the grammatical structure of a sentence you can use it as a sort of 'map' to explore its meaning. For example, if a computer has successfully discovered the grammatical structure of the sentence *'the cat sat on the mat'* ('parsed' it), then it can determine that the sentence was about a cat that was doing something. It would, of course, have to look up what the properties of a cat were and how this affected its behaviour, but at least with the sentence parsed it could make a start on understanding its meaning.

Notorious Infamy

To round off this introduction to language it is worth recounting the story of a program that achieved a certain amount of notoriety – Eliza. Not too long ago during the early experiments with language and AI a program was written that could converse on a variety of preset topics. The program was called *'Eliza'* (after the famous character in Shaw's play *'Pygmalion'*), and it worked by detecting the presence of certain 'keywords', changing the tense and extracting clauses from the user's input. Thus it could 'turn' sentences round and 'fire' them back at the user.

The most successful version of this program would talk about personal problems and was therefore called *'Eliza Doctor'*. Although very simple, it had a large vocabulary and this combined with the way that humans 'read meaning' into things made it very convincing. It was *so* convincing that 'real' patients and 'real' doctors started using it – indeed, some patients preferred it to a human doctor!

The principles that Eliza uses are very easy to describe. Firstly it scans any input for certain 'keywords'. On detecting one of these keywords its action is always the same. It either prints a standard message or it uses part of the input to construct a message. For example, if you were to type *'I hate icecream'*, it would detect the keyword 'hate' and respond with *'It is not good to hate'* – it will produce this response irrespective of the rest of the sentence. To introduce some variety, it can make use of what's input. Any sentence that the user types in is scanned for the occurrence of words or phrases such as *'my'* or *'you are'*. If any of these are found then they are changed appropriately (eg, *'my'* is changed to *'your'* and *'you are'* is changed to *'I am'*. The purpose of this simple change is that input sentences can then be printed back at the user as if they are originated by the program. For example, *'You are an idiot'* becomes *'I am an idiot'*.

These two techniques – keyword response and tense changing – added to a few other specialised tricks can produce a program that will carry on a reasonable conversation. BASIC Eliza programs are available which are only a few pages long – another testament to how willing we are to believe that computers are intelligent!

Next month: How understanding is *your* QL?

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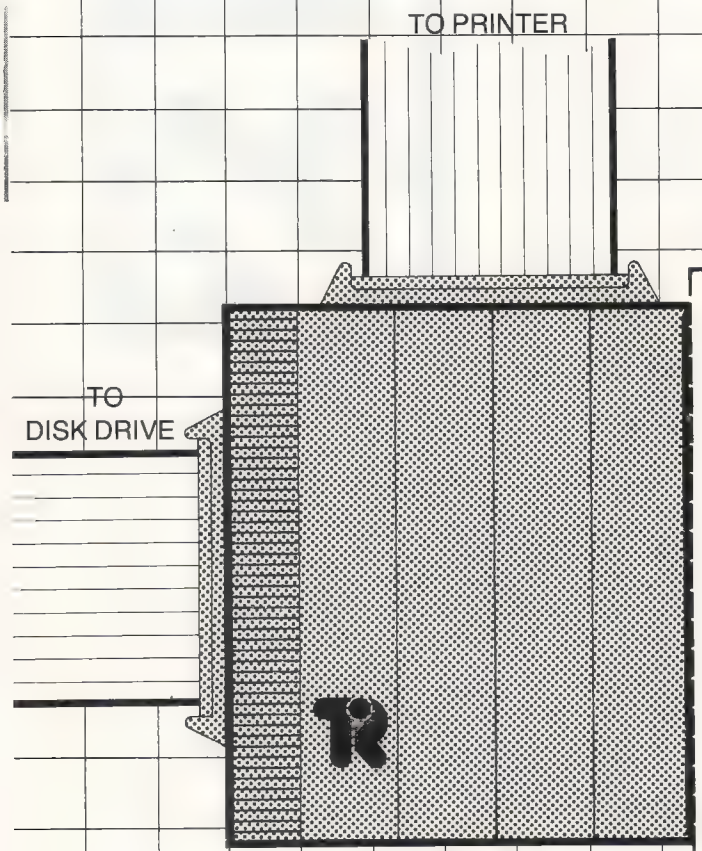

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SYSTEM VARIABLES

ILLUSTRATION BY ROY INGRAM

Intrepid hacker and technical writer Adam Denning launches our new series on personalised QL set-ups, their pros and cons.

Having been asked to describe the components of my QL system and explain why I bought each particular unit, it seems only natural to put horse before cart and explain why I bought a QL in the first place.

A computer journalist by trade, and freelance programmer besides, I had been looking at various 68000-based machines for quite a while. At the time of the QL's 'launch', there weren't too many of these about. Apple had just released its Macintosh, but short on development software and with only Pascal to play with this didn't seem a very good environment in which to learn 68000 machine code or indeed to write any programs on at all. The only other alternative at the time was to opt for a Sage Supermicro (now Stride), but with even the most basic model selling at £3000 plus, this was beyond my means.

When the QL was launched then, the hyperbole surrounding it had almost everyone going, and with Sinclair's name behind it there seemed to be no alternative but to buy one. So I ordered two. The interminable wait, the dongled machines and the unfinished SuperBasic interpreter, all made history (as well as good copy). However, one thing was certain, anguish and inconvenience aside, it was obvious that there *was* a good machine inside there and I soon found myself using Quill to write all my articles and books. Also I began to delve deeper into the QL's innards. At first this wasn't easy, as there were no assemblers and no debuggers to be found. Nevertheless, I had a book to write and a publisher to placate so I was forced to learn the hard way working out the binary codes for each individual operation.

During the early months of QL ownership, I used an ordinary Sony Trinitron television as my display unit. Eventually, I built up a lead which enabled me to use my Microvitec Cub RGB monitor with the QL. This monitor's main purpose was as a VDU for my BBC Micro, but as disenchantment quickly set in with

both the machine and the policy of its manufacturers, Acorn, it seemed no loss to use the monitor exclusively with my QL.

Likewise, the printer which had served me so well for a couple of years, an Epson RX-80 F/T, was soon moved across, using a Miracle Systems serial-to-parallel converter. I had to make a slight alteration to the printer end of the cable, as I wanted the Epson to use auto line feed with the QL but not with my other machines. This was simply a matter of grounding pin 14 on the Centronics plug.

So, this was my rudimentary word processing system! It had its problems, of course. The worst two were the monitor, which was unable to display the entire QL 85 column screen, and the microdrives, which although not bad in themselves were so abused by Quill that saving and loading documents was a nerve wracking experience.

As hardware support materialised the monitor problem was solved easily enough – I looked at a few and decided that the official Sinclair one, the Kaga Vision QL, was the best in all respects. It has a wonderful display which can deal with stipples in mode 0 without a trace of dot crawl, and at £299 it wasn't going to break the bank. It also had the additional virtue of not looking out of place with the other components of system.

The microdrive problem was a little harder. A number of manufacturers had begun to sell floppy disc interfaces for the machine, but it was rather difficult to choose one. Some had a better specification but were expensive, others did the one job at a low price but weren't the most versatile of systems. Again, the fact that I already owned a BBC Micro helped me to make my choice.

The BBC Micro had a Torch Z80 disc pack, which comes equipped with its own dual 80 track drives. I wanted something that could use these expensive drives to my best advantage, without forcing me to go to the unnecessary expense of buying more drives.

The Computamate disc interface was the ideal choice, then, as Quest was reputedly having problems with its own interface, and the other company which was then in the market, Medic, was also unable to supply a unit off-the-shelf. The decision to buy the Computamate interface proved not only to be the best move disc interface-wise, but also a good move in its own right as the proprietors of the Cambridge-based company proved to be excellent contacts and very good friends. When you're in the business of writing software for a new machine, the ability to call on people who know a lot more than you is a definite advantage!

Once the disc interface was installed, I could get 720K on each floppy disc, which is seven times as much as a microdrive cartridge. The speed and data security advantages have made program development vastly more enjoyable than when the built-in microdrives were the only storage medium.

Recently, though, I gave the BBC Micro away (yes, you read that correctly!) and returned the Torch disc pack to the lenders. I'd had it for a long time, but it didn't seem fair to keep hold of it now that its *raison d'etre* had gone. I had to buy a new set of disc drives, and plumped for Cumana's 80/40 track switchable twin drives with integral power supply. They are double sided as well, of course. I managed to get a fair bargain on these, at £276 including VAT, and they are more compact and a little less noisy than the Torch drives. There is one slight problem, though. The unit seems very prone to *glitch* inducement, which means that I always have to reset the QL as soon as I switch the drives on. No-one can give a reasonable solution to this, so I have learnt to live with it.

The fact that the drives are switchable between 40 and 80 tracks is no real advantage as far as the QL is concerned, but it is a great help when I'm trying to read MS-DOS or CP/M-86 discs created on my Zenith Z150 PC clone. Also, my philosophy is that drives which can be used for more than one application without a corresponding increase in cost must be worth having.

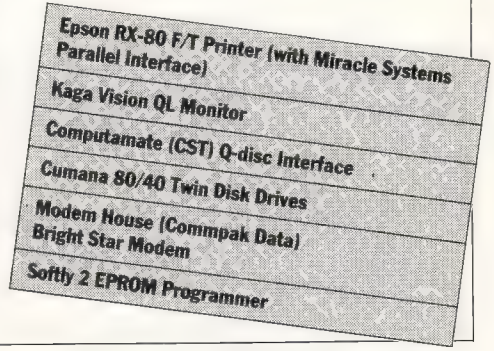
I also have a 256K RAM board, but am unable to use this in conjunction with the disc drive interface as there is only one expansion slot on the QL. This most annoying of hinderances will be cured as soon as CST begins shipping its Plus 4 expansion board, the prototypes of which have proved to be wonderful additions to a QL setup.

The only other piece of hardware which is permanently connected to my QL is the Commpak Data/Modem House Bright Star modem, which functions much as modems do and enables me to get into Pergamon Infoline. It would enable me to get into Prestel and Micronet if I hadn't previously cancelled my subscriptions!

Finally, a lot of the software that I develop is blown into EPROMs, and the only tool I have to do this at the moment is the Softy 2 EPROM blower. This unit, which costs £195, is designed really for the smaller 2K and 4K EPROMS rather than the more useful 2764 and 27128 8K and 16K units, so it has the disadvantage of being able to blow only 2K segments at a time. I download software from the QL into the Softy via its serial link, 300 Baud seeming to be the most reliable speed. This involved changing a link on the Softy board, to reverse its RS-232 polarity, and soldering two other wires to it to serve as the serial input. A fairly trivial purpose considering the funtionality of this unit – already proven as a major software house has bought one of my products on the strength of an EPROM blown by the Softy.

That wraps it up as far as my QL setup goes, but of course no hardware is of any use until you get some software for it. I program mainly in Assembler and BCPL, but it's very likely that I will take C programming seriously on the machine once one of the promised real C compilers appears.

Of items which I would be likely to purchase if and when they are released, the most pressing must be the Plus 4 expansion unit, followed by a smallish (15-20MB) hard disc unit and an electronic coffee maker!



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STRING MANIPULATION

The ability to manipulate text as easily as numbers sets the computer apart from the calculator. Marcus Jeffries explores an often overlooked aspect of the QL's operation.

Character string handling on the Sinclair QL is very different from the majority of microcomputers. Instead of the common functions LEFT$, RIGHT$ and MID$, the QL allows 'string slicing' as a generalisation of all three.

Once a string has been defined, with a statement such as:

str$="QL User"

it can henceforth be regarded as a vector (ie, one dimensional array) of seven elements. So, if you were to type:

PRINT str$(2 to 5)

you'd get the result:

'L Us'

other string slicing operations might be:

PRINT str$(4) to give 'U',
PRINT str$(4 TO) to give 'User'.

Now try:

PRINT str$(TO 5)

You may be surprised to find that you get an 'out of range' error message. Fortunately, you can easily avoid this by specifying:

PRINT str$(1 TO 5)

Anything outside the range one to seven will also give the 'out of range' error. String slices can also appear on the left-hand side of the expression, so:

str$(3 TO 5)="xyz"

will change elements three, four and five of the string. If you now change str$ by typing:

str$="QL User Magazine"

then the length of str$ will have been increased to sixteen. You can easily verify this by using the built-in function:

PRINT LEN(str$)

and so finally answer the question 'How long is a piece of string?'.

Another way of defining a string is to dimension it as a vector. Try:

```
DIM str$(7)
str$="QL User Magazine"
PRINT str$
```

Here you'd expect to find that only the first seven elements have been set. However, if you look closely, you'll notice that the space between 'User' and 'Magazine' has also been included, indicating that the array really has *eight* elements. Typing:

```
str$="12345678"
PRINT str$
PRINT DIMN(str$)
PRINT LEN(str$)
```

should confirm this. This might not seem so unusual when you consider that:

DIM a(7)

will produce eight elements, numbered zero to seven. Maybe the same thing is happening with string arrays. Unfortunately, that would be far too sensible. Instead of having elements zero to seven, the string array is numbered one to eight. Try:

PRINT str$(1 TO 8)

then:

PRINT str$(0 TO 7)

The second attempt will give another 'out of range' error, inferring that element zero doesn't exist. Now type:

PRINT str$(0)

Lo and behold you get the result '8'. Is this the string dimension? Well, try:

```
str$="abcd"
PRINT str$(0)
```

and you'll get the answer '4'. This value then is the *real* length of the string.

String slices on the left-hand side of the expression are better defined if you've dimensioned the string first. Try the following:

```
DIM str1$(7)
str1$=""
str2$=""
str1$(3 to 5)="xyz"
PRINT str1$,str1$(0)
str2$(3 TO 5)="xyz"
```

You'll find that the *str1$* assignment doesn't change the string, and the zero element is still zero. When you try to assign *str2$*, however, you get the familiar 'out of range' message.

The more conventional string functions on other micros offer similar facilities for slicing, but tend to be far more cumbersome to use. However, those who wish to convert programs to run on the QL will find the SuperBasic functions in *listing 1* useful. You may also come across

Listing 1

```
100 DEFine FuNction LEFT$ (str$,num)
110 RETurn str$(1 TO num)
120 END DEFine LEFT$
130 :
140 DEFine FuNction RIGHT$ (str$,num)
150 RETurn str$((LEN(str$)-num+1) TO)
160 END DEFine RIGHT$
170 :
180 DEFine FuNction MID$ (str$,num1,num2)
190 RETurn str$(num1 TO (num1+num2-1))
200 END DEFine MID$
```

MID$ with only two parameters. As a string slice, this is simply:

str$(num TO)

Another anomaly between the QL and most other micros occurs when comparing strings. As you might expect, all of the following are true:

"Z" > "A"
"AB" < "ABC"
"abc" = "abc"
"xyz" <> "XYZ"

If you print out the CODEs of these examples, then everything appears to be working correctly. Now try:

PRINT CODE(" "),CODE("A")

which will give 32 and 65, respectively. So a space should be less than "A" yet

IF " ">"A" THEN PRINT"TRUE"

prints "TRUE", so, the test is not merely a simple comparison between the character codes.

The QL is quite intelligent in the way that it tests strings. For instance:

"123" > "99"
"123" > "9.999"

are both true, because the numerical value of 123 is greater than 99 and 9.999. But take care, because:

"–55" > "–33"

is *also* true. Our short program

STRING MANIPULATION
CONTINUED

(listing 2) allows you to try out comparisons for yourself.

Listing 2

```
100 CLS
110 REPeat test
120   PRINT"Type first, then second string"
130   INPUT"--> ";s1$,s2$
140   PRINT "";s1$;" > ";s2$;""
150   IF s1$>s2$ THEN
160     PRINT"   is TRUE"
170   ELSE
180     PRINT"   is FALSE"
190   END IF
200 PRINT FILL$("-",30)
210 END REPeat test
```

One final comparison which we haven't mentioned is '==' which stands for 'approximately equal to'. This can be very useful when checking user input, as the following examples will show:

"YES" = "yes" gives FALSE
"YES" == "yes" gives TRUE
"Yes" == "yEs" gives TRUE

A complementary operation to string slicing is string concatenation. Unlike many micros which use the + operator, the QL uses the &. So, if:

str1$ = "ABC" and str2$ = "XYZ"

then:

str1$ & str2$ = "ABCXYZ"

The reason for using the ampersand becomes clearer if we look at the way the QL handles *coercion*. In general, if the type of the right-hand side of an expression is not the same as the variable on the left-hand side, then the QL will attempt to coerce the result so that it can complete the assignment. Thus, if you type:

v% = "123"

the integer variable *v%* will be assigned the number 123, even though it is shown as a string. Similarly:

v% = 123

will convert the number 123 into a string. We can now see the difference between '+' and '&'. Try the following:

v% = 4321
v$ = 4321
PRINT v% + v$
PRINT v% & v$

The first PRINT statement using the '+' sign gives the numerical result '8642'. In the second case, use of the ampersand implies a string result, so '43214321' is printed.

String slicing and concatenation combine to provide the programmer with an extremely powerful tool for handling text. A good example is to be found in *listing 3*, where a simple

Listing 3

```
10 CLS
20 animate_title "  This is a title..."
   ,3,1,7,0,5,4,4
100 DEFine PROCedure animate_title
   (mess$,w%,h%,i%,p%,l%,c%,s%)
120 CSIZE w%,h%
130 INK i% : PAPER p%
140 REPeat title
150   IF INKEY$(s%)<>"" THEN EXIT title
160   AT l%,c%:PRINT mess$;
170   mess$=mess$(2 TO) & mess$(1)
180 END REPeat title
190 END DEFine animate_title
```

concept produces an elaborate special effect. The crucial line (170) of the **animate_title** procedure simply rotates the string parameter by one character. So, that assigning:

str$ = "1234567890"

and applying

str$ = str$(2 TO) & str$(1)

gives

str$ = "2345678901"

and so on. The overall effect is of a title moving across the screen. The routine uses the following parameters:

mess$ . . . The title message.
w% . . . Character width (0 to 3).
h% . . . Character height (0 to 1).
i% . . . Ink colour.
p% . . . Paper colour.
l% . . . Line (in current character size).
c% . . . Column (in current character size).
s% . . . Speed (higher = slower).

A more complex example of how text may be manipulated is to be found in *listing 4*. The purpose of

Listing 4

```
100 CLS
110 combination "ABCD",""
115 :
120 DEFine PROCedure combination (s$,t$)
130 LOCal i,a$,b$
140 :
150 IF s$="" THEN
160   PRINT t$,
170 ELSE
180   FOR i = 1 TO LEN(s$)
190     a$=s$(1 TO (i-1))
200     b$="" : IF i<LEN(s$) THEN b$=s$((i+1) TO)
210     combination a$ & b$,t$ & s$(i)
220   END FOR i
230 END IF
240 :
250 END DEFine combination
```

this routine is to print all possible combinations of any given string. For instance, with the string "123", the combination would be:

123, 132, 213, 231, 312, 321

This is done by using recursion where the string is sliced in two with one part held constant while the other is shuffled. We then take the latter and slice it in two possible combinations of the characters, descending level by level until we have exhausted every character. We then return to our original string, shuffle that and descend once more. We can thus consider the combinations of the string "123" to be:

(i) The first character (1), plus combinations of the others ('23' and '32')
(ii) the second character (2), plus combinations of the others ('13' and '31')
(iii) and, the third character ('3), plus combinations of the others ('12' and '21').

In programming terms the outer loop, *i*, goes through the string, *s$*, considering each character in the first position. The string *a$* contains all the characters before the *i*th, and *b$* contains all the characters after. The result is then found by calling the routine, passing the *i*th character into *t$*, and creating a new *s$* of the characters in *a$* and *b$*. On each recursive call, *t$* will have been concatenated with each character of all the characters remaining in the string, until finally all the characters have been transferred from *s$* to *t$*. At this point, the first part of the IF statement will print the result, then exit from the last recursive call to print the rest of the combinations. When using the routine, the first parameter should be the start string, and the second should always be the null string (ie ""). Remember that there will be *N!* (factorial) combinations for a string with *N* characters, so don't let the strings get too long. An eight character string will produce 40,320 different results.

To finish, we look at two more specialised string functions. The first is INSTR, which returns a value denoting the position of one string inside another, so that:

PRINT "DEF" INSTR "ABCDEFGHI"

would return the value four, because the start of the first string inside the second is in the fourth position. A result of zero indicates that there is no match. A use for this may be as part of an adventure game where commands would be picked up, use something along the lines of:

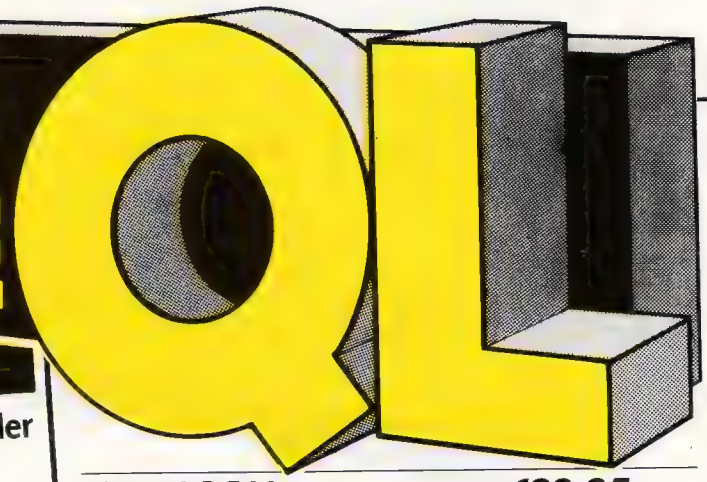
```
REPeat get_direction
INPUT"Type direction
  (NESW) -> ";dir$
dir% = dir$ INSTR "NESW"
IF dir% THEN EXIT get_direction
END REPeat get_direction
```

Finally, FILL$ is a very useful instruction. It is used to create a string containing a repetition of one or two characters. For instance it is always a good idea to set the maximum length of a string when it is first created. This could be done with the instruction:

str$ = FILL$(" ",maxlength)

Any slices on this string up to its maximum length will now avoid the 'out of range' error, even if you haven't specifically placed any information in the string.

RELEASE THE POWER OF THE QL



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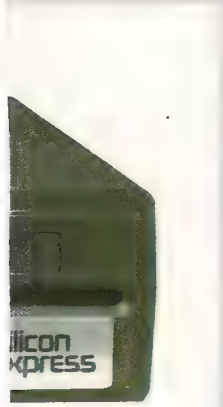

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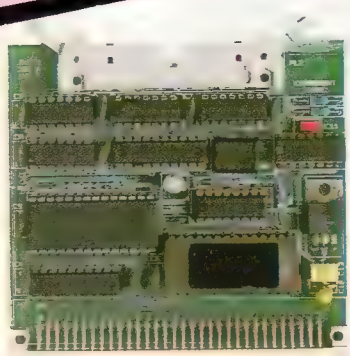

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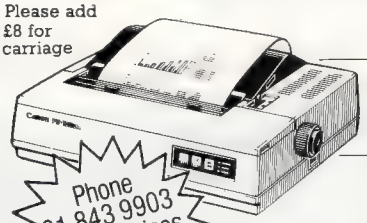

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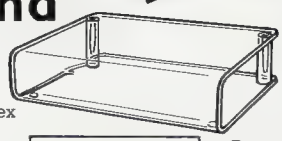

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dipping in

The first instalment of our definitive guide to connecting a printer to the QL. Paolo Baccanello delivers some hard-hitting DIPswitch, wiring and protocol information.

Many computer users regard a printer as little more than a glorified typewriter. Simply plug it in and away you go. Nothing could be further from the truth. Printers are sophisticated electronic devices in their own right and, for the novice at least, the task of linking them up to a computer is often fraught with complications.

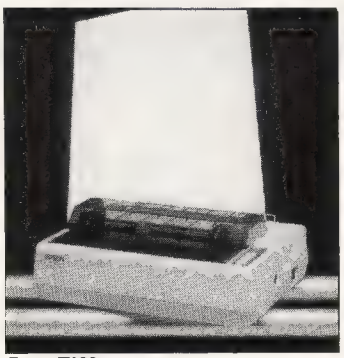
Things wouldn't be so bad if printer manufacturers kept to a common standard. Unfortunately they don't. The manner in which information is received, the speed at which it's sent, the protocols which determine how it is to be acknowledged or validated, as well as the control codes which must be issued to determine typeface and print style – all vary from printer to printer.

Fortunately, the QL's designers and Psion's programmers have taken this into account and have sought to make installation as painless as possible. To this end the former have allowed users to specify parity, protocols and handshaking directly from within SuperBasic, using variations on the OPEN command to control transmission via the QL *ser1* port (see 'User Guide', Concepts section under Devices). Additionally, the rate at which information is transmitted may easily be set using the BAUD command.

Psion, for their part have gone one step further. Their *install_bas* program provided with Quill not only allows the user to specify how information will be sent but also to select different typefaces and alter which characters are to print. The program need only be run once and provided that a copy of the *printer_dat* file it creates exists on your Abacus and Archive cartridges, will be able to produce hard copy for these programs, as well as for Quill. Sadly, this does not apply to Easel which requires a special machine code 'driver' routine to reproduce graphics in print. The only driver currently supplied is for an EPSON FX 80 and creating other routines is beyond the scope of this article.

Operating instructions for Psion's *install_bas* program are fairly straightforward and given in the information section of the 'User Guide'. However, for those wishing to define their own printer 'drivers' or customize an existing one then some background information would not go amiss.

Our first point is a general one. That is, whilst the QL transmits information serially many printers, especially the dot matrix variety, receive information in parallel, via a



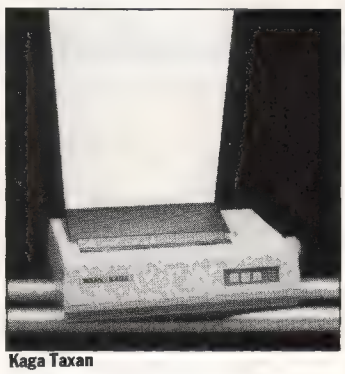
Epson FX80

Centronics type interface. This being the case some kind of signal convertor will be required. The choice is between extra PCB's which fit inside the printer and are supplied by the manufacturer, or very much cheaper plug-in-and-go 'junction' boxes, available from companies such as MicroPeripherals and Miracle Systems. Either way users should acquaint themselves with the technical specifications of such interfaces as this information will be required for installation.

Also, users contemplating buying a disk interface at the same time as their printer should bear in mind those more recently introduced incorporate a parallel port which may be used instead of the QL serial port. If this is the case then installation is very much easier, simply specify the new port (usually called 'par') and move directly to setting up your control codes.

Once Psion's *install_bas* has been run and the option to define your own driver selected, the first prompt that confronts you relates to 'parity'. This refers to the manner in which information is validated when transmitted serially – that is, one bit after another down a single wire. Here, a character is sent to the printer by the QL as a group of eight binary digits or 'bits'.

Using a parity check it is possible to monitor transmission character by character. However, technicalities aside, the important thing is to ensure that the QL adopts the same parity check (if any) as that used by your printer.



Kaga Taxan

The next prompt relates to the BAUD rate. Like parity this applies exclusively to serial transmission. Obviously, if information is transmitted at one speed and received at another, data will be lost in the transfer. Consequently, you should ensure that BAUD rates are identical at both ends. In general, on printers with serial interfaces fitted internally the BAUD rate may also be varied at the printer end by altering the factory settings of the DIP switches. On the junction box interface the rate is fixed at the QL's default of 9600 BAUD.

The next three prompts, relating to lines, characters and continuous forms are self explanatory. However, users intending to use continuous stationery should be aware that without a tractor feed it is virtually impossible to align the paper without it getting tangled. Also, you should note that page numbering is a default option on Quill packages but is often undesirable when a friction feed is used as sheets must be fed in manually and aligned precisely. To get rid of this option enter Quill and set upper and lower margins (F3 + 'M') to zero.

A Real Character

The remaining entries on Psion's set-up routine relate to the various combinations of character codes which will be sent to the printer whenever you wish to change typefaces or character set. Known as 'control codes' these apply only to the majority of dot matrix printers and differ from printer to printer, either due to the manufacturer's whim or simply because those features to which they relate have not been implemented. At the end of this article we list the codes for some of the more popular printers available for the QL.

For the time being, users should appreciate that they are not necessarily bound by Psion's classifications. During set-up you could, for example, just as easily enter the codes to print italics and enlarged type instead of those for superscript and subscript.

The codes to alter typeface are easily located in most printer manuals and require no explanation. The same applies to the 'end of line' and 'end of page' codes.

The 'preamble code' is sent whenever one of Psion's programs is entered. In a sense it initialise's the printer for the particular application you wish to use the program for. For example, if using Quill to write letters, you could use it to select an English character set dot matrix printer. Similarly, the postamble code is sent whenever you leave Quill. So, if when not wordprocessing you use the printer to produce listings for 'The Progs' you would enter the codes to select American character set, condensed print and 50 character width. For an Epson FX80 the entry is:

ESC,"R,0,ESC,15,ESC,"Q,50

The Translate entries are intended for users wishing to customize their printer's character set by defining their own letters. As the character code for the pound sign on the QL does not correspond to that recognised by most printers, ▶

this feature is indispensable for those wishing to produce financial reports. The appropriate entry here is:

"£,"#

Here a '#' (hash) sign is sent instead of the '£' sign and, provided the printer has been initialised to use the English character set, will print out as a pound sign. Confusing perhaps but it is the only way of getting sterling in print.

Another use for the translate character is to produce composite characters. For example, on daisywheel printers it is often necessary to redefine the hash sign as:

"#,"=,<BS>,"/

Here the printer will print first the '=' (equality) sign and then backspace to overprint it with a slash. The result is a close approximation to a '#' hash sign.

Translate characters can also be used to add extra functions to Quill. This is done by redefining keys unlikely to be used in the course of printing so they switch on and off special features on the printer. For example, if you had a colour printer the copyright symbol could be redefined to switch to red ink, and the '|' symbol to switch to black. The only drawback of using this method is that what you see on screen will not necessarily be what is printed.

Once translate characters have been entered the definition of the printer driver for Psion's programs is complete. All that remains is to press F5 for the driver installed on whatever microdrive or disk specified at the start of the program. Thereafter, any Psion program on that cartridge or disk will automatically load the driver to print text. The driver is stored in a file called *printer_dat* and may be copied across wherever necessary.

Character codes entered either indirectly via Psion's printer driver or, directly from SuperBasic using the PRINT statement provide a means of controlling a printer from the QL connection end. Another form of control, this time at the other end, is to alter the DIP switches located somewhere inside the printer itself.

Typically DIP switches control the following functions:

Auto line feed
Here the printer will automatically move the paper up one line whenever it encounters the character code for a carriage return. If you find that unintentionally lines print out with a gap between them you should switch this facility off. If on the other hand lines start printing on top of each other, switch it on.

Zero font
When set this will print a zero with a slash '0' through distinguishing it from the letter O.

Paper End detector
This will halt printing if there is no paper.

Buzzer
Will cause the printer to bleep in certain circumstances.

Print Mode
Determine the print style adopted upon powering up. The choice is usually between NLQ, Pica or condensed.

Character Set
Usually a combination of switches which will determine the default international character set. Set for UK if you want the pound sign.

This completes our general introduction to connecting up printers to the QL. Hopefully, the information given so far will be sufficient for those users, whose printers are not specifically covered in this series, to piece together their own printer driver.

Brother EP44

Judging by the amount of correspondence we have received concerning the EP44, this cross between a typewriter and printer would appear to be extraordinarily popular amongst QL users. Something of a surprise when you consider that it is slow, fussy about the kind of paper it prints on and won't reproduce graphics. But then it is very cheap, has its own keyboard, will run off batteries and is portable.

As with most Brother products the EP44 comes with a built-in serial interface. Unfortunately, the RS232C lead supplied by Sinclair alongside the QL needs to be modified if it's to be linked to the EP44. Connections are:

QL pin	Brother pin
1	7
2	2
3	3
4	20
5	5

Additionally, pin 6 should be disconnected at the Brother end as it carries a 12 volt DC current *when* the printer runs off 6 volts, so a contact could prove disastrous. Finally, connect together Brother pins 4, 5 and 6. For those not adept at soldering, SMC Supplies sell specially made up cables.

Unlike all other QL printers, the EP44 has no DIP switches. Instead, setting up at the printer end takes place on an LCD screen, where in response to certain prompts the following values should be entered:

Prompt	Response
Baud Rate	1200
Bit Length	8
Parity	N
New Line	CR+LF
Code	T/W or 8BIT
ER	Y

The options for the code entry determine whether the EP's typewriter or normal print style will be used. The former permits underlining, superscript and subscript and is well suited to Quill applications. The latter permits access to a larger character set and is better suited to Abacus and Archive.

Setting up the printer driver on Psion's Quill is just as easy. As the EP44 has few typestyles, users may find it more convenient to select Psion's default driver and merely edit the appropriate lines before installing.

Parity	*none*
Baud Rate	*1200*
End of Line code	*<CR>,<LF>*
End of Page code	*<FF>*
Preamble code	*none*
Postamble code	*none*
Emphasise on	*n/a*
Emphasise off	*n/a*
Underline on	*<ESC>,"E*
Underline off	*<ESC>,"R*
Subscript on	*<ESC>,"U*
Subscript off	*<ESC>,"D*
Superscript on	*<ESC>,"D*
Superscript off	*<ESC>,"U*
Translate 1	*"£,"#*
Translate 2	*"!,"",<BS>,".*

Of note, the second translate character enables you to print an exclamation mark. It does this by printing a single quote and then backspacing to place a full stop beneath it.

This completes the EP44 installation, though you should note that when listing programs the Baud rate should be specified, as in:

```
10 OPEN #4,ser1C:BAUD
   1200
```

One final feature of the EP44 is that with built-in memory and some very simple terminal emulation it is possible to use microdrives as a store for its own documents. To do this put the printer into Terminal Mode and run the following two line SuperBasic program on your QL:

```
10 BAUD 1200
20 COPY ser1c to
   mdv2_filename_exp
```

and press CONT + TEXT on the EP44. Ignore any messages on the QL's screen and when the microdrive has stopped whirring enter Quill, import the file (F3+O+F+I) and remove any control codes imbedded within it. Once this has been done the file can be manipulated in much the same way as any other Quill document file.

Brother M1009

One of the few impact dot matrix printers available for under £200, the Brother M1009 represents remarkably good value. The one feature that endears it to many QL users is that it comes with both serial and parallel interfaces as standard. The former means that it can be connected directly to the QL and, as many owners will have received a free printer cable with their machine, at no added cost.

Having said this, if you are using the RS232 cable supplied by Sinclair, your first task will be to dismantle it and alter the pin connections as follows:

QL pin	Brother pin
1	7
2	2
3	3
4	20
5	5

One warning here, the above connections relate to versions 'J' of the M1009 (prefix before serial number). Models 'K' onwards carry the 'standard' Brother serial interface and should be rewired in exactly the same manner as the EP44 mentioned earlier. If you're not a dab hand with a soldering iron, then an alternative would be to purchase the appropriate cable from your local computer shop or failing that from SMC Supplies.

The next step is to set the DIP switches located at the front of the printer. These are numbered from right to left. Here, we give two alternative settings, one for version K and the other for later versions. These are:

Switch	Version K	Later
1.1	off	on
1.2	on	on
1.3	on	on
1.4	on	on
1.5	on	on
1.6	on	off
1.7	off	off
1.8	off	off

Switch	Version K	Later
2.1	on	on
2.2	on	on
2.3	off	off
2.4	off	on
2.5	on	off
2.6	off	off
2.7	off	off
2.8	on	on

DIP switch settings are well explained in the printer manual. Nevertheless, as some people may wish to vary the Baud rate note that switches 1.3 to 1.6 are currently set to give the QL's 9600 Baud default. Furthermore the settings for 2.3 and 2.4 are very much a matter of personal preference. The former gives the English character set with the £ pound sign as opposed to the $ (dollar), the latter, a slashed 0.

With the DIP switches set all that remains is to run Psion's *install_bas* program and define the following printer driver.

Par	*Space*
B R	*9600*
EoL	*<CR>,<LF>*
EoP	*<FF>*
Pre	*<ESC>,"R,3*
Post	*None*
E on	*<ESC>,"E*
E off	*<ESC>,"F*
U on	*<ESC>,"−,<SOH>*
U off	*<ESC>,"−,<NUL>*
Sub on	*<ESC>,"S,<NUL>*
Sub off	*<ESC>,"T*
Sup on	*<ESC>,"S,<SOH>*
Sup off	*<ESC>,"T*
T	*"£,"#*

Epson RX/FX80

Epson's name has become a byword for extremely reliable low cost dot matrix printers. The control codes that their printers use are almost an industry standard. Not surprisingly then, Psion's packages are geared to work with Epson's range with a minimum of modification. Indeed, the screen supplied with Easel will ONLY work with Epson compatible printers.

As an FX80 driver is supplied by Psion we limit ourselves to DIP switch settings, which should be:

1.1 off	2.1 on	A.1 on
1.2 on	2.2 on	A.2 off
1.3 off	2.3 off	A.3 on
1.4 off	2.4 off	A.4 off
1.5 off		A.5 on
1.6 on		A.6 off
1.7 off		A.7 off
1.8 off		A.8 on

The printers, in fact, contain only two DIP switches, the third listed here with the prefix A gives settings for Epson's own internally fitted serial interface. Points to note are that the interface should be set so that the parity check is disabled and to accept an 8 bit word length. The Baud rate may be varied (here it is set to 4800). The command *OPEN #4,ser1z* produces a listing.

Juki 6100

A popular choice amongst business users, the Juki 6100 Daisywheel printer requires an RS232 interface to be fitted if it is to work alongside the QL. The interface supplied by Juki themselves, though by no means cheap is very easy to fit. Its settings are:

Sw	Position	
1	on	300 Baud
2	on	300 Baud
3	off	Printer ready
4	off	Enable parity
5	off	Even parity
6	on	2 stop bits

DIP switches on the printer as opposed to the interface should be set as follows:

1 off	4 off	6 on	9 off
2 off	5 on	7 off	10 off
3 on	6 on	8 on	

Psion's driver should appear:

Par	*Even*
B R	*300*
EoL	*<CR>,<LF>*
EoP	*<FF>*
Pre	*<CR>,<ESC>,<HT>,<NUL>,<ESC>,"9*
Post	*None*
E on	*<ESC>,"W*
E off	*<ESC>,"&*
U on	*<ESC>,"E*
U off	*<ESC>,"R*
Sub on	*<ESC>,<RS>,<ACK>,"U,<ESC>,<RS>,<BS>*
Sub off	*<ESC>,<RS>,<ACK>,"D,<ESC>,<RS>,<BS>*
Sup on	*<ESC>,<RS>,<ACK>,"D,<ESC>,<RS>,<BS>*
Sup off	*<ESC>,<RS>,<ACK>,"U,<ESC>,<RS>,<BS>*
T	*"£,"#*

Points to note are that the preamble code has been set so the printer head is located to the left platen which is the default position in Archive. Also shadow print has been adopted instead of bold (<ESC>,"O).

Finally, to get a listing from SuperBasic the appropriate command is: *OPEN #4,ser1ehc*

Smith Corona L-1000

At 12 cps the L-1000 is a little slow. However, if you can live with the speed then it does have a number of advantages. It comes with a serial and parallel interface as standard and better still, the default setting of the DIP switches need not be altered for the printer to work with a QL. This means that once you have defined your Psion driver the following apply:

Par	*Even*
B R	*1200*
EoL	*<CR>,<LF>*
EoP	*<FF>*
Pre	*<ESC>,"C,<ESC>,"9*
Post	*None*
E on	*DEF*
E off	*DEF*
U on	*<ESC>,"C*
U off	*<ESC>,"R*
Sub on	*none*
Sub off	*none*
Sup on	*none*
Sup off	*none*
T	*"£,"#*

Canon PW1080A + Kaga Taxan NLQ

Amongst the first NLQ printers on QL market, there is little to distinguish the Canon from its marginally cheaper cousin the Kaga Taxan aside from a 20 cps increase in print speed. As for installation procedures these are identical.

Regarding physical connection, both printers are supplied with a Centronics interface as standard. A serial to parallel convertor will be required to link up to the QL. Costs vary but in general the interfaces fitted internally and supplied by the manufacturers are two to three times more expensive than the plug-in-and-go variety.

The printers incorporate three sets of DIP switches whose settings should be as follows:

1.1 on	2.1 off	3.1 off
1.2 on	2.2 off	3.2 off
1.3 off	2.3 on	3.3 off
1.4 off	2.4 off	3.4 off
1.5 off	2.5 off	
1.6 on	2.6 off	
1.7 on	2.7 off	
1.8 off	2.8 off	

Points to note are: the UK character set is selected so that the £ sign will print; zero will print with a slash through it (1.6); we make use of a 3K internal buffer to speed up printing. If you wish to define your own character set turn the reset switch 2.3 to off to reserve some memory; the default print mode is not set to NLQ as although this can be done it's time consuming and unnecessarily reduces the range of typefaces available.

B R	*9600*
EoL	*<CR>,<LF>*
EoP	*<FF>*
Pre	*<ESC>,"R,3*
Post	*None*
E on	*<ESC>,"E*
E off	*<ESC>,"F*
U on	*<ESC>,"−,1*
U off	*<ESC>,"−,0*
Sub on	*<ESC>,"S,1*
Sub off	*<ESC>,"T*
Sup on	*<ESC>,S,O*
Sup off	*<ESC>,"T*
T 1	*"£,"#*
T 2	*,<ESC>,"(*

Note here that the QL's copyright symbol is used to turn on NLQ mode.

Quen Data DWP 1120

'Letter quality' daisywheel printers are traditionally very much more expensive than their dot matrix cousins. At around £295 Quen Data's 1120 is the exception.

The 1120 can be connected up without hitch using the RS232 cable supplied along with the QL. The DIP switches are easily accessible at the front of the machine. Switch 1 is located on the left, looking from the front of the printer and switch 2 on the right. Both are numbered from right to left and should be set as follows:

1.1 open	2.1 open
1.2 open	2.2 open
1.3 closed	2.3 open
1.4 open	2.4 open
1.5 closed	2.5 closed
1.6 closed	2.6 closed
1.7 open	2.7 open
1.8 closed	2.8 closed

Moving onto Psion's printer driver this should appear as:

B R	*300*
EoL	*<CR>,<LF>*
EoP	*<FF>*
Pre	*<ESC>,<SUB>,"I*
Post	*None*
E on	*<ESC>,"W*
E off	*<ESC>,"&*
U on	*<ESC>,"−*
U off	*<ESC>,"R*
Sub on	*none*
Sub off	*none*

To obtain listings from within SuperBasic the appropriate line would be: *OPEN #4,ser1hc : BAUD 300*

This completes October's helping of settings and drivers. Next month we will cover, amongst other printers, the Riteman 2 from C-ITOH, CPA-80 Q and Brother's HR5 and HR15/25/35.

PUZZLE PAGE

Code breaking used to be confined to dimly lit rooms in Whitehall. Now P Derlien gives you a chance to try it out for yourself on your QL

HACHG LHETB MTZOG HKRWL BNKQC QNBDX NOMCA BADCE ALKQW IZY

No, the typesetter hasn't lost his grip. This is a question to which you might know the answer *if you knew what the question was*. It is written in a substitution cipher based upon letter pairs called Playfair, invented by Sir Charles Wheatstone in the mid-19th century but named after his best friend. So how does it work?

To encipher the message "THIS WILL DEMONSTRATE HOW IT WORKS" you first need to think of a short phrase ie, "CLIVE SINCLAIR" and put it into a 5×5 matrix omitting any repetitions (*fig 1*).

C	L	I	V	E
S	N	A	R	

Now fill out the matrix with those letters of the alphabet which have not been used (in alphabetic order, of course). We now have our substitution alphabet (*fig 2*). Note that the letter J is never used. If a J appears in the message, just write it as I. Everyone will understand.

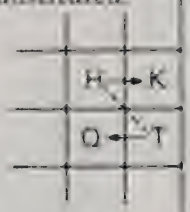
C	L	I	V	E
S	N	A	R	B
D	F	G	H	K
M	O	P	Q	T
U	W	X	Y	Z

The next stage involves breaking the message down into pairs. If the same letter crops up twice in a pair insert a null letter, such as X to split them. If you finish on an odd number, again tag on a null letter (*fig 3*).

TH	IS	WI	LX	LN	OW	DE	MO	NS	TR	AT	EH	OW	IT	WO	RK	SX

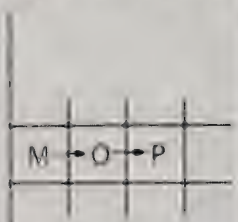
Three rules now dictate how the letter pairs are to be substituted:

Rule a) If the pair aligns diagonally then substitute the letters from the opposite diagonal. For example with the first pair **QK** replaces **TH** as shown in *fig 4(a)*.



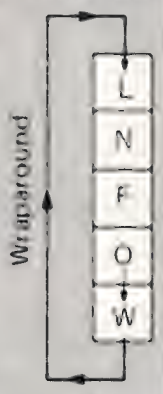
(a)

Rule b) If the pair lies on the same row of the grid substitute each letter with that immediately to the right of it. If one of the letters requiring a substitute is located in the rightmost column then wrap-around to the first column. *Fig 4(b)* demonstrates the technique with the fourth pair **MO**.



(b)

Rule c) If the pairs lie in the same column then substitute with the letter immediately below. Again, if a letter requiring a substitute is located on the lowermost row wraparound to the top row to find its substitute (*fig 4(c)*).



(c)

Following these rules your enciphered message should appear thus:

Playfair has its weaknesses. Letter pairs are consistently represented by the same substitute. As tables exist listing the frequencies of all the 676 possible letter pairs in the English Language many of which seldom, if ever occur, it would be possible (with a long message) to reconstruct the substitution alphabet by a lengthy process of elimination.

A more enjoyable, though arguably less systematic method for cracking the code would be to guess the key phrase used to order the alphabet. To this end we include a program in the PROGS for enciphering and deciphering Playfair. The program should be tested using the example given in this article. Once satisfied that the program works, you will be able to make use of the following clue to decipher the question at the start of the article.

CWCFZ OCPFS UQBEZ SFDRH SYBET LNYF1

Now for a clue to the clue of the keyphrase! This time in plain English. To know the keyphrase-to-the-clue-to-the-clue you will need to know who a famous English king first married.

The (Cryptic) Solution

If the Playfair puzzle proves a little too difficult to solve, here is a quickie that will help restore confidence in your code breaking capabilities:

```
10 RESTORE:CLS:READ L
20 FOR J=1 TO L: READ K:PRINT
   CHR$(J+K);
30 DATA 7,65,71,79,63,71,63,76
40 DATA 5,70,80,66,65,70
50 DATA 8,64,78,77,72,64,74,66,61
60 DATA 10,50,66,66,63,75,70,58,
   59,60,73
70 DATA 3,64,66,65
```

When run this program will yield five clues to a mathematical sequence that will decipher the following message which in turn contains the answer to the Playfair puzzle.

MKWWCZEP HDU NEQWQBR WPB BWREDNGKD KD XQWELM ZLA LAPZGWLQ NB TBMEAB

Original	TH	IS	WI	LX	LN	OW	DE	MO	NS	TR	AT	EH	OW	IT	WO	RK	SX
Enciphered	QK	CA	XL	IW	NF	WL	KC	OP	AN	QB	BP	VK	WL	EP	LW	BH	AU
Rule Applied	a	a	b	a	a	c	c	a	b	b	a	a	c	a	c	a	a

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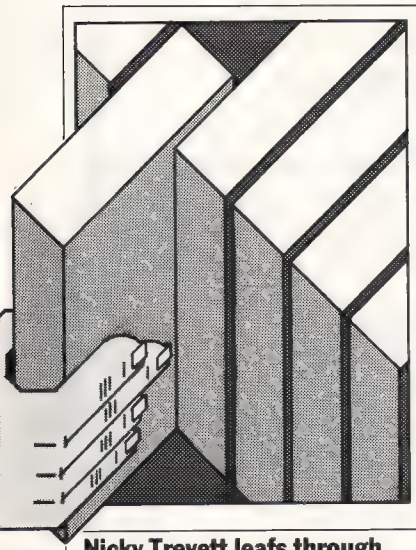

Nicky Trevett leafs through the latest for your computer library shelves.

Heaviest new book of the month must be Century's *QL Archive*, the latest in a series on Psion's software packages written by members of Blueprint. Anyone familiar with this series will know that the books centre on the activities of the scatterbrained Blake family, as they prepare for a wedding, run their business activities and generally turn to their QL to get them out of every tight spot. This volume, written by Ian Murray, continues the theme but with more emphasis on the workings of the software, which is hardly surprising in view of the particular complexity of Archive. There is less room for the liveliness and humour of the earlier books.

For £14.95 you get 350 pages of solid information and practical advice. Some of it will be familiar if you have read other books in the series, particularly the first chapter which deals with such basic matters as the workings of the QL keyboard and microdrives, although some of this is specific to Archive – particularly the sections relating to the screen, commands and editing text.

The book is suitable both for beginners and as a reference for more experienced Archive users. It takes a careful step by step approach, taking the reader through each stage in whatever process it is describing, including what to type in or what key to press. There are masses of practical examples, mostly concerning the day to day trivia of Miranda Blake's wedding although there are applications taken from business too.

From simple information storage and retrieval, the book moves on to multiple files, functions and procedures to help save time on repetitive tasks. Additionally, loops, listing and printing information, finding, sorting and maintaining records, designing screens, paging, totalling, and printing out are all covered. There is also a chapter showing you how to make links and connections across files which can then be used in more than one application.

Each chapter takes an easy to follow layout; an introduction to the subject matter, points to remember, step by step instruction, and at the end a summary of what has been learned in the chapter with some helpful hints.

There are four appendices, variously concerned with getting out of trouble, memory and maximum records, differences between Archive versions, and ASCII codes, and for once there's a really thorough index which includes commands and functions.

This book surely contains everything you are likely to want to know about Archive for most purposes, presented in a highly readable manner. Highly recommended.

Archive Archetype

For sheer detail, *QL Archive* overshadows another new Archive handbook, *Advanced Archive on your Sinclair QL* by Malcolm Davison, published by Sigma Press at £7.95. Much of the information contained in this book is also covered by QL Archive, but it is not entirely fair to compare the two since *Advanced Archive* does not pretend to be an all-purpose guide to Archive.

It sets out to fill in the gaps the author feels exist in the Archive manual, offers some tips and hints on making Archive work better for you, and provides a number of useful or off-beat applications. It is less coherent and well-ordered than *QL Archive*, which has the advantage of a strong 'theme' to hold it together. There is a lot of rather dry introduction, to Archive, Psion, software development, before the book gets down to an overview of the Archive commands.

This is followed by a chapter on string handling and another rather useful one on making your programs more 'friendly' to use. Other chapters look at the date and time, ways of creating reports (the author feels Archive's own facilities are limited), making better use of memory, and – very briefly – integration with the other Psion programs.

The second part of the book is, to my mind, the more interesting. You might not necessarily find a need for the applications described here, but they could give the Archive enthusiast a lot of food for thought.

There is an Archive utility program, a slide synchroniser and lecture prompter, an expert system, an adventure game, a calculation editor, an option analyst program, a printer typeface select, a personal accounts program and a personnel management suite. Some are short and simple, and some highly complex, but listings and commentary are provided for all of them.

An odd little book which is not easy to categorise, but could be worth buying for the applications alone – if you're interested enough to explore Archive further.

Code Corner

There are plenty of books around for anyone interested in the 68000 family of processors, a member of which lies at the heart of the QL. Some are massively comprehensive, leaving very little room for a new look at the subject.

But from Sigma Press comes a readable little book. The *68000 User Guide* written by Lionel Fleetwood, and a little pricey at £8.95, sets out to give the reader with some

PHOTO BY TERRY BEDDIS

understanding of a high-level programming language, such as BASIC, a grounding in Assembly language programming.

It is well thought out, being divided into eleven sections with a short introduction to each. The author suggests you go through the book reading the introductions to get the flavour of the book, then start at the beginning and read to the end. You will probably get on a lot faster if you have an assembler and can practice writing code as you work through the book.

The first section looks at 68000 architecture, including the buses and the registers. Next there is an introduction to assembler, followed by a chapter dealing with instructions and modes. There are sections on stacks, registers and modes, moving data, writing subroutines, register and arithmetic verbs, bit level operations, rounded off by a couple of chapters on problems and better programming style.

The text is clear and to the point, and the author is fond of using analogies to illustrate the points he makes – like the sprinter with one leg chopped off to explain an 8-bit data bus – but this is still not a book for the computing novice. You'll need to understand basic computer hardware principles if you are to keep pace with it.

Faulty Formula

If Assembly programming is still out of your reach and you need to get to grips with SuperBasic first, Donald Alcock has come up with something a little different.

His *SuperBasic on the Sinclair QL*, published by Cambridge University Press at £5.95, sports a flame-red cover, handwritten text, lots of diagrams and real bugs in the programs – that is, little drawings of insects to indicate a (deliberate) mistake in a program.

It's aimed at three types of reader; the programmer who needs a reference manual, the newcomer to SuperBasic programming, and the programmer using any language who might find some useful tips and solutions to problems.

There are indeed a lot of useful and practical hints, and plenty of opportunity to practice your programming skills – in games, and so on. But I'm not sure that it's particularly suitable for the real beginner.

The introductory section specifically written for the newcomer to computing plunges the hapless novice straight into mathematical formulae in order to help explain how a computer sets about solving problems. Fine if you're doing maths at school, not so good if you've forgotten all about radii, pi and the like.

And although the pages are busy and lively, and there is a sense of fun running through the book, the handwriting gimmick and the, at times, rather cramped drawings and diagrams do not always help when you are struggling to get to grips with a difficult subject. Nor does it make for quick and easy reference.

The book views programming very much from the point of view of the natural mathematician, and if that describes you, and if the bland presentation and rather dry prose of many introductions to programming saps your enthusiasm, this offering might appeal. Otherwise, check what else is available.

QL Make Believe

Stuck for something to do with your QL at weekends? Try some simulations. *The Real Thing?* by Patrick Hall, published by Sigma Press at £7.95, sets out to equip you to program your own simulations or, as the back cover would have it, "engineer your own dreams".

Simulations programs aim to recreate events in the real world, and as the author points out, they can be absorbing, especially when you have the power of a micro like the QL at your disposal.

There are 20 simulation programs provided in the book, covering such diverse fields as biology, machines, landscapes, computer-aided design, climate, geology and astronomy. The programs are arranged in order of complexity, so that later programs use techniques introduced in earlier ones.

The simulations include a gas turbine, an early steam engine, a simulation of vision, a road system for a new town, the phases of the moon, a trip to Mars, even a volcanic eruption.

Each program is accompanied by a commentary explaining what is going on in the listing. The listings in each case are complete (some are several pages long) and knowledge of SuperBasic is not mandatory, but the commentaries make no concessions to anyone new to programming.

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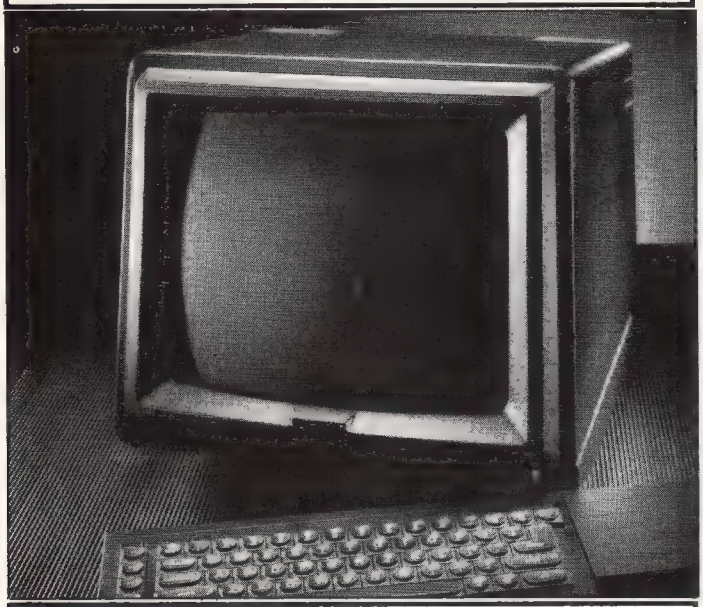

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BEAT PSION CHESS

A guide to the Achille's heel of Psion's Chess, expounded by Brian Beckett.

Psion's Chess is the current world microcomputer champion and, unless you are a Grandmaster, playing it can be frustrating. Fortunately, however, the Psion program may be defeated using the *Queen's Gambit* opening.

There appears to be a blind-spot which overlooks the longer-term consequences of grabbing pieces offered as sacrifices to further an attack-strategy. The program is also over-zealous when defending minor pieces despite a crumbling position.

Strategic Counters

The *Queen's Gambit* consists of White opening with *P-Q4* followed by *P-QB4* after Black's reply. Defences are generally classed as either *Queen's Gambit Declined* or – if Black takes the pawn following 1: *P-Q4, P-Q4* 2: *P-QB4 – Queen's Gambit Accepted*. Although the pattern of moves varies for each game, the same ploy will beat a variety of the program's answers to the *Queen's Gambit* with an ease that would shame any reasonably competent human player. The trick is the Queen-Bishop combination attacking the QL's castled King at *KR2*. After Black snatches the freely offered knight with the King's Rook pawn, P x P to both attack the QL's defending Knight at *KB3* and free the White King's Rook for added pressure on the computer's *KR2*. The check *B-R7* pins the Black King in the corner and the sacrifice *B-N8* (with a *discovered check*) clears the diagonal for *Q-R7* and forces checkmate in, at the most, two moves.

If you wish to work through these games quickly and a chessboard isn't handy, use the program's 2-Player command for the screen. If you play from the beginning, delay your moves for a minute or two. The QL analyses the board while waiting for your move and quick or long-delayed play may bring a different, but not necessarily better, reply. In testing Level 11, I adjusted White's move-times to keep the player's clock running at roughly half that of the QL until the mate became unavoidable.

White's P x P (Move 13 in Games A, B and E; 11 in D and 12 in C) is the QL's point of no return as Mate is certain if it doesn't do something to prevent *B-R7* pinning the King in the corner. In Game D, Black's two Bishop Checks postpone the final decision until after White's N x B in Move 13. In Game C, the exchanges on White's *K4* block the Bishop's diagonal and put off the QL's moment of truth until after B x P in Move 14.

Using the Set-up command to play Game C (the *Slav Defence*) from the critical position at Move 14 Black's reply to B x P is *P-KN3*, again blocking the diagonal. This is better but still leads to checkmate on White's 24th move. Playing Game D from Set-up on Move 13, Black (as in the full game) replied *B-N2* to N x B. But, playing from Move 11, the sequence was the same until 15 P x N, *R(KB1)-K1;* which brought checkmate a move earlier.

From Set-up on Move 13, Game A was the same and, in Game E, the QL played *N-Q4* instead of *B-N2* – this makes no difference at all. In Game B, the QL plays *R-Q1* instead of *P-K4* in reply to P x P which does get it out of immediate trouble. But Black still landed in checkmate on White's 29th move after steadily giving away material to delay the inevitable. Games A and B are the beginnings of the *Orthodox* and the *Tchigorin Defences* respectively.

Inevitable Delays

White's moves are not always the best chess-play but they are the sequences which blitz the QL at Level 11 – a level above the one Psion classes roughly as tournament standard. The ploy works for other *Queen's Gambit* defences and at the lower levels as well; though the moves may differ. There are some *Queen's Gambit* defences (for example, the *King's Indian:* 1: *P-Q4, N-KB3* 2: *P-QB4, P-KN3* 3: . . .) where the strategy is not suitable.

Unless White extends his playing time significantly to give the QL greater opportunities to select better moves, the computer's performances at Level 12 (where its average move-time matches the player's) are more-or-less the same as the lower levels. With patience and the time to spare, Level 13 (where the QL requires infinite time) should boost the computer's play to the point where White has a real challenge to the *Queen's Gambit*.

The ease by which the same ploy defeats a variety of *Queen's Gambit* defences at the top levels is a bit of a disappointment in an otherwise excellent chess program. But, unless Psion spoils things by correcting the program, it's always possible to exploit this blind-spot to impress unwary QL-owning friends by giving their world chess champion micro-computer a sound beating!

	WHITE	QL
1	P–Q4	P–Q4
2	P–QB4	P–K3
3	P–K3	N–QB3
4	P–KR3	N–KB3
5	N–KB3	B–Q3
6	Q–B2	O–O
7	N–QB3	B–K2
8	B–Q3	P x P
9	B x P	Q–Q3
10	B–Q3	P–QR3
11	N–KN5	P–KR3
12	P–KR4	P x N
13	P x P	N(QB3) x P
14	+B–R7	K–R1
15	P(K3) x N	Q x P(Q5)
16	P x N	R–K1
17	+B–N8	Q–KR5
18	+R x Q	K x B
19	+Q–R7	K–B1
20	+Q x P Mate	

(a)

	WHITE	QL
1	P–Q4	P–Q4
2	P–QB4	N–QB3
3	N–QB3	P x P
4	P–K3	N–KB3
5	B x P	P–K3
6	N–KB3	B–N5
7	Q–B2	O–O
8	B–Q3	B–R4
9	P–QR3	+B x N
10	P x B	Q–Q3
11	N–N5	P–KR3
12	P–KR4	P x N
13	P x P	P–K4
14	+B–R7	K–R1
15	P x N	P–KN3
16	+B x P	K–N1
17	+B–R7	K–R1
18	+B–N8	K x B
19	+Q–R7 Mate	

(b)

	WHITE	QL
1	P–Q4	P–Q4
2	P–QB4	P–QB3
3	N–K3	N–KB3
4	Q–B2	P–K3
5	N–KB3	B–Q3
6	B–Q3	N–R3
7	P–QR3	O–O
8	P–B5	B–B2
9	N–QB3	P–QN3
10	N–KN5	P–KR3
11	P–KR4	P x N
12	P x P	N–K5
13	N x N	P x N
14	B x P	R–N1
15	+B–R7	K–R1
16	+B–N8	K x B
17	+Q–R7 Mate	

(c)

	WHITE	QL
1	P–Q4	P–Q4
2	P–QB4	P x P
3	N–KB3	N–KB3
4	P–K3	P–K3
5	+Q–R4	P–QB3
6	Q x P(B4)	B–Q3
7	B–Q3	P–QN4
8	Q–B2	O–O
9	N–KN5	P–KR3
10	P–KR4	P x N
11	P x P	+B–B5
12	B–Q2	+B x B
13	N x B	B–N2
14	+B–R7	K–R1
15	P x N	P–KN3
16	+B x P	K–N1
17	+B–R7	K–R1
18	+B–N8	K x B
19	+Q–R7 Mate	

(d)

	WHITE	QL
1	P–Q4	P–Q4
2	P–QB4	P x P
3	N–KB3	P–QR3
4	P–K3	N–KB3
5	B x P	P–K3
6	P–QR3	N–QB3
7	Q–B2	Q–B3
8	N–QB3	B–K2
9	B–Q2	O–O
10	N–KN5	P–QN4
11	B–Q3	P–KR3
12	P–KR4	P x N
13	P x P	B–N2
14	+B–R7	K–R1
15	P x N	KR–Q1
16	+B–N8	Q–R7
17	+R x Q	K x B
18	+Q–R7	K–B1
19	+Q–R8 Mate	

(e)

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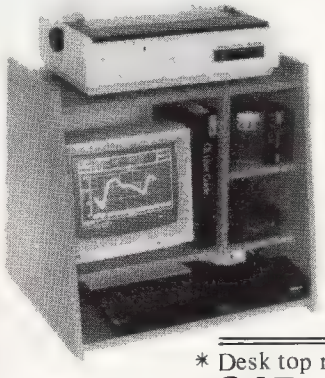

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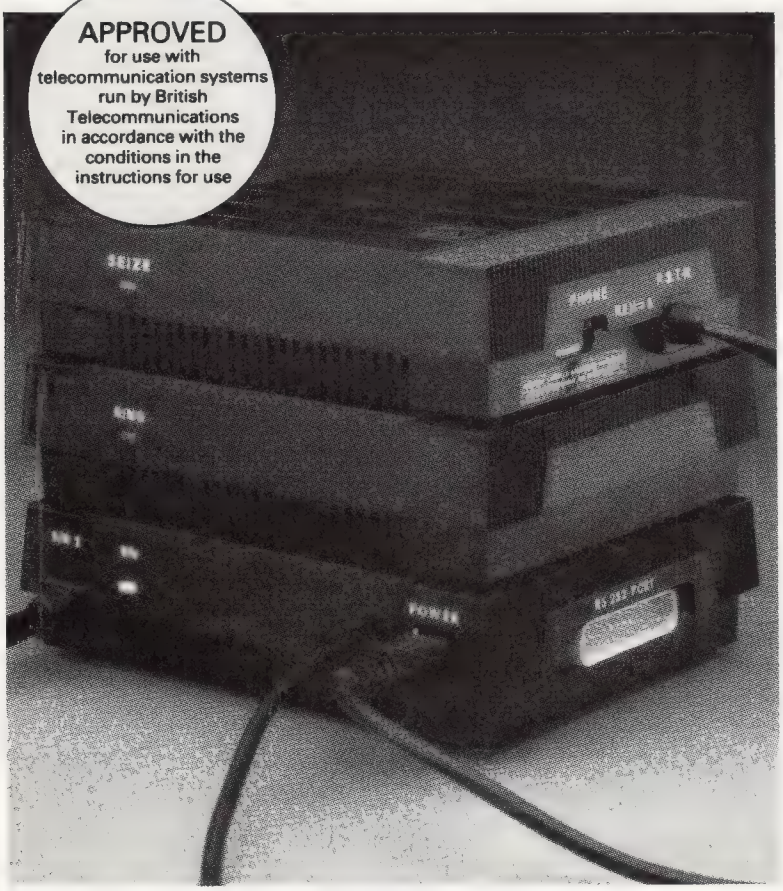

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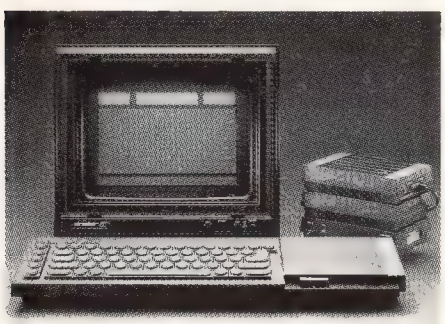

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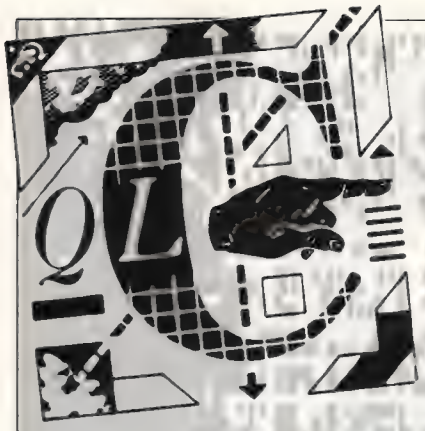


C SERIES

Learning how to use pointers is far from simple. However, without them little can be achieved – Adam Denning carefully explains the matter.

Continuing our series on *C* we look at *pointers*. Fundamental to the language they are, unfortunately, exceedingly difficult to come to terms with but without them very little can be achieved. However, before we can get stuck in and start pointing at things, we need to explain a few associated concepts. The first is *indirection*.

Assume that you have to go to a press conference to see the launch of a new wonder computer. The conference starts at 10am, which means you'd like to go there first thing in the morning. Unfortunately, you've left the address of the hotel where the conference is being held in the office, so you have no choice but to go to the office first, pick up the address, and then go to the hotel. In short, you have to go *indirectly* to the hotel via the office. So, indirection is simply "the process of getting somewhere by going somewhere else first". In computerspeak, we would say that you indirected through the office to get to the hotel. We could also say that the office contained a *pointer* to the hotel.

In real life indirection may seem trivial, however, on computers where there are many thousands of locations it provides an extremely useful way of ensuring that control, or data is directed to the right place at the right time. To do this we store pointers at strategic places and indirect through them to get to our original destination.

The next concept is the *1value*. This is derived from a mathematical fundamental called an assignment *expression*. An assignment expression is something like

*a = b+2*3/5*

but it could be as simple as

a = 5

The important thing is that every assignment expression puts the value of the right hand side of the expression (everything to the right of '=') into the left hand side of the expression. This is known as *assignment*, as we are assigning the value of the expression to the object on the left hand side.

For this to make sense in computing terms, the left hand side of the expression must represent something that we can place a value into, such as a variable or an element of an array. So, although mathematically speaking we could say

*a+4 = 5*c- d/34*

we would have to say

*a = (5*c-d/34)-4*

for the assignment to be valid on a computer. If the left hand side of an assignment expression conforms to this rule, it is known in *C* as an *1value*.

A *C* 1value has two fundamental properties – we can assign to it, and we can take its *address*. More importantly, it is the ONLY element of a *C* program which we can assign to and take its address.

Taking matters one step further, the *address* of an object is a value representing the physical location or home of the object itself. In other words, the address of an 1value *points* to the 1value itself. Aha! I hear you say. The address of something is a pointer to that something. Correct!

So, it follows that if we have the valid assignment expression *a = 4* then we can re-write this to use indirection. Where the & (ampersand) symbol represents the operator which returns the address of something, and the * (asterisk) sign as the operator which returns the contents of an address, then *(&a) = 4* MUST be the same as *a = 4*. The * is known as the *indirection operator*, as it causes the code to indirect through the pointer to which * is applied to get at the thing inside. The *address operator*, &, is obviously the exact opposite of this.

You may be wondering why on earth we would want to write *(&a) = 4* when the simpler *a = 4* would suffice. Certainly, in simple expressions like this, we would be stupid to do so, but supposing *a* was a pointer rather than a variable. Then, *a = 4* would set the value of the pointer to 4, not the contents of the pointed-to item. To achieve that, we would need to type *a = 4.

Where does all this lead? We'll see the advantages by writing two versions of a function to copy a string from one character array to another. The first will use arrays and subscripting, the second pointers and indirection.

```
/* The first version - using arrays
*/
ourcopy(s1,s2)
char s1[],s2[];
{
    int i;
    i = 0;
    while (s2[i] = s1[i]) i++;
}

/* The second version - using
pointers */
ourcopy (s1,s2)
char *s1,*s2;
{
    while (*s2++ = *s1++);
}
```

Let's examine the first version in greater detail. The function **ourcopy** has two parameters, the string array from which we are copying the string, *s1*, and the string array to which we want to copy, *s2*. We declare both these as being character arrays, by

char s1[],s2[];

Inside the function, we need an integer variable to be used as the subscription index. We've called this *i*, and we set it to zero at the beginning to give us access to the first element of each array. The next line is far more simple than it looks:

while (s2[i] = s1[i] i++;

We have a while loop which controls one statement *i++*; *i++* adds 1 to the value of *i*; it is directly equivalent to *i = i + 1*) The condition which decides when the while loop terminates is obscured by being written in typical *C* style – as compact as possible! We know that, in *C*, strings end with a byte value zero, and that zero represents the value 'FALSE'. Also, EVERY expression in *C* has a value, even assignment expressions. This means that the assignment expression

s2[i] = s1[i]

puts the character from *s1[i]* into *s2[i]* AND returns the value of the character as the value of the expression. As the zero character marks the end of a string, the value of the assignment expression will always be TRUE (non-zero) until the final '0' character has been moved from *s1* to *s2*. When this happens, the while loop terminates and the function ends. The nett effect is to move every character up to and ▶

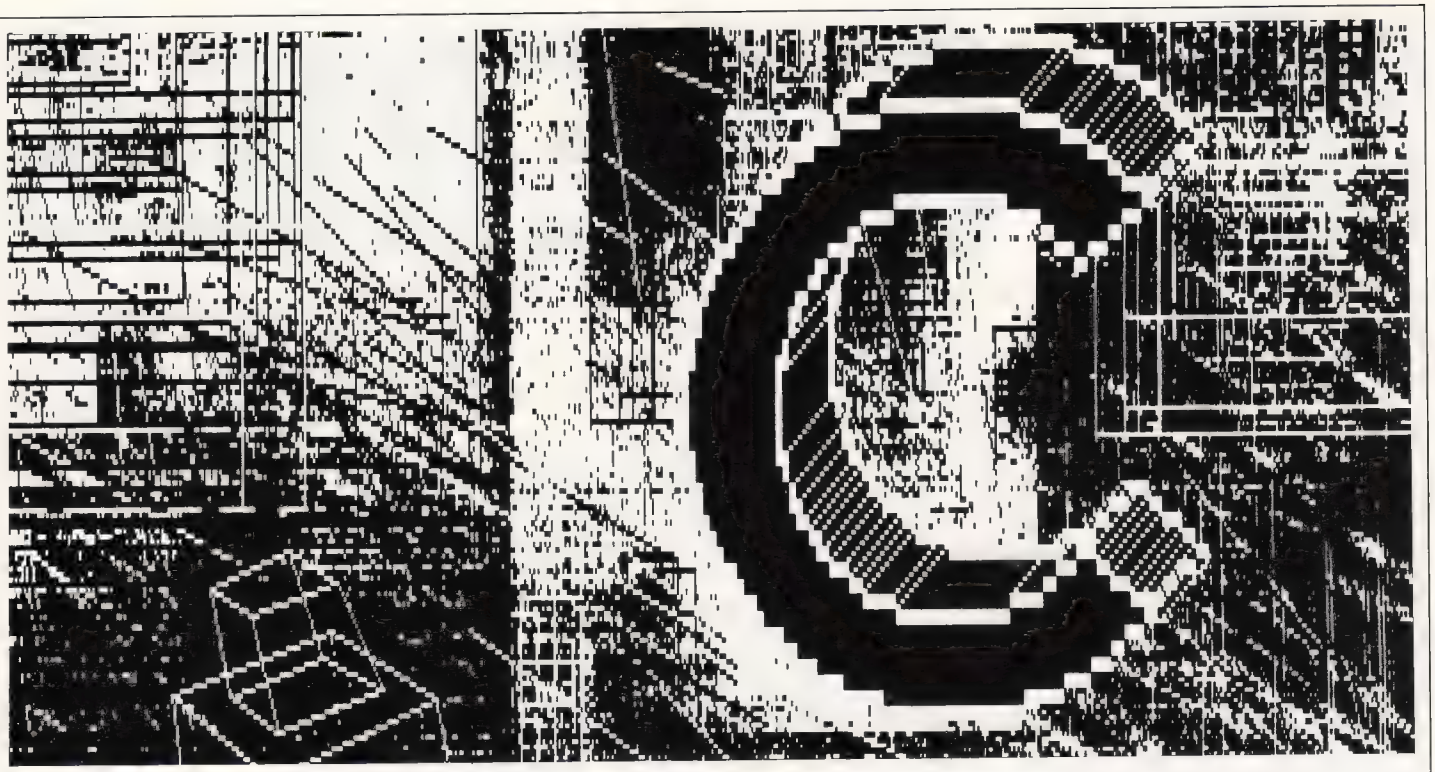


ILLUSTRATION BY GEORGE SNOW

including the terminating \ 0' from *s1* to *s2*.

Now let's look at our pointer version of the function. The first thing we notice is that the declarations of the parameters *s1* and *s2* have changed from

```
char s1[],s2[];
```

to

```
char *s1,*s2;
```

The first version of the declaration says that *s1* and *s2* are both character arrays, while the second says that *s1* and *s2* are both pointers to characters. If you remember, an array name is a pointer to the first element in the array, so array names are themselves pointers. The declarations are EXACTLY the same; they mean the same thing, but the second version is used more widely as pointers and indirection are used more often than array subscription. We'll see why in a second.

Inside the function, we have just one line:

```
while (*s2++=*s1++);
```

This is still a while loop, but this time it controls nothing directly. All the work is done in the conditional expression within the brackets. If we forget the ++ increment operators for a minute, our expression is

```
*s2=*s1
```

which is saying 'Use *s1* and *s2* as pointers; take the value of the thing *s1* is pointing to and put it in the location pointed by *s2*. As *s1* and *s2* both point to character arrays, the things moved are characters and the first move would be to take a character from the start of array *s1[]* and place it in the start of *s2[]*. Here

```
*s2=*s1
```

is identical in effect to

```
s2[0]=s1[0]
```

Now we can bring the ++ increment operators back into play. As these operators appear directly after ***s1** and ***s2**, they are known as the *postfix* version of the operator. They increment the 1value they are applied to AFTER it has been used in the expression. As the * indirection operator has a lower precedence than ++, it gets evaluated last, but the postfix version of ++ returns the value of the lvalue prior to the incrementation. So,

```
*s2++=*s1++
```

is equivalent to

```
*s2=*s1
s1++
s2++
```

which has the effect that after the character has been moved, both pointers are incremented to point to the next character in the array.

The expression as a whole is of course an assignment expression, so it has a value equal to its right hand side *(*s1)*, which means that the while loop will terminate when a zero byte has been moved, just like the array and subscription version.

The important thing to note about the two versions is that the pointer version uses no extra variables; it is also faster, as *C* is better at dealing with pointers, and will generally compile to more compact code. This is why *C* programmers use pointers so much.

As well as getting to grips with the more straightforward aspects of pointers, we've also learnt that * means 'is a pointer to' and & means 'the address of'. Remember that we can only take the address of 1values, so it follows that whatever a pointer points to, that item must be an 1value (as **(&a)* is equivalent to *a*).

It does not follow, though, that a pointer is itself an 1value. In our example *s1* and *s2* were, because they were the parameters of a function and therefore local variables, but the declared name of an array most specifically IS NOT an 1value. We'll see what that means by writing a function to convert a number into a binary string.

```
/* first version – it won't work! */
binary(number)
int number;
{
    char string[17];
    int i;

      for (i=15;i>=0;i--)
        if (number & (1<<i))
          *string++='1';
        else *string++='0';
    *string=\ 0';
}
```

As we said, an array name is not an 1value, so *string* above cannot form the left hand side of an assignment expression. This means that **string++='1'* and **string++='0'* will fail (the function shouldn't even compile) as the postfix ++ operators are being applied to the non-1value string. Notice that **string='0'* is fine, as the thing being assigned to is whatever string points to, not string itself. We get around this by introducing a new variable:

```
/* second version – it will work! */
binary(number)
int number;
{
    char string[17],*ptr;
    int i;

    ptr=string;
    for (i=15;i>=0;i--)
      if (number & (1<<i))
        *ptr++='1';
```

```
        else *ptr++ = '0';
    *ptr = \ 0';
}
```

Here we bring a new variable into play – *ptr*, which is a pointer to a character. Before we start the main loop, we make *ptr* take on the value of *string*, so that they both point to the same thing. The difference is that *ptr* is an 1value and *string* is not, although they both point to the same thing. Now, **ptr++ = '0'* and **ptr++ = '1'* are both perfectly legal.

Why is an array name not an 1value? The answer has to do with the declaration

char s[12];

does not mean 'create a variable, s, and make it point to an array of 12 characters' to the compiler, it means 'create an array of 12 characters, and remember where you put it. Now, whenever the programmer uses the identifier 's' (within the scope of this array), substitute that value'.

This means that the compiler remembers the address of the array as a constant, but does not ever assign this value to the name of the array. It simply equates *s* with the address of the first element. There is no variable *s*. This is often very difficult to remember, but vitally important. If ever your compiler throws up an error message along the lines of

'Need an 1value here'

check your code for array-name assignments.

We can perform various mathematical operations upon pointers, but the size of the object which the pointer points to is always taken into consideration by the compiler. Thus, although we have said that

s1++

adds 1 to *s1*, it is more correct to say that it adds one unit of whatever *s1* points at to *s1*, making *s1* point to the next object. If we had a pointer, *p*, which pointed to an element of an integer array, then

p++ and **++p**

would make *p* point to the next integer in the array. Likewise,

p−− and **−−p**

make *p* point to the previous integer in the array.

If we can increment and decrement pointers in this way, it follows that we can add and subtract integers from them. Again, the size of the pointed-to objects is taken into account, so if *p* points to the *n*th element of an integer array,

p+5 points to the *n+5th* element

and

p−3 points to the *n−3th* element

The *C* language is not going to stop us adding or subtracting any integers from a pointer, so it is up to us to ensure that the result of the operation still points to a valid member of the array if that's what we're going to use it for. There is none of this 'array index out of bounds' stuff produced by Pascal compilers.

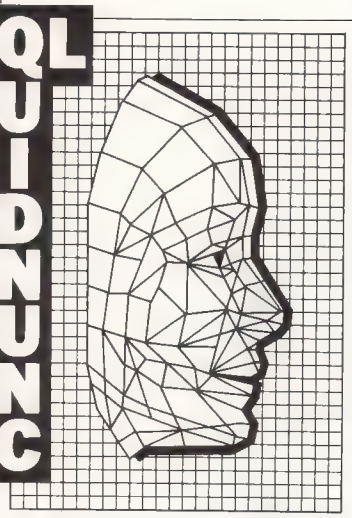
We can also subtract a pointer from another pointer, but this only makes sense if the pointers being subtracted points to elements of the same array. The result is an integer representing the number of elements between the two pointers. If *p1* points to the *n*th element of an array, and *p2* points to the *n+7*th element of the same array, then

p2−p1 returns the integer 7.

We cannot add pointers, as it does not make a lot of sense, even if they point to the same array. Think about if. You'll find that it is just as nonsensical to multiply, divide, shift (and so on) pointers. No useful values can be obtained, which is why we're not allowed to do it. As we can subtract pointers, it makes sense to compare pointers, provided they point to elements of the same array.

The subject of pointers is extremely thorny, but at the same time incredibly powerful. Next time round, we're going to look at a new data type known as the structure, which allows us to get into the really cryptic subject of pointers to structures. Cheer up, we could have talked about pointers to pointers to pointers . . . !

QL QUIDNUNC



In our new hard-hitting hotline, Silhouette homes in on the latest hearsay.

The news this month is that the Z80 has had its comeuppance and the 6502 has been declared extinct. The 68000 is now officially *the* chip. Amstrad will go with it in Spring, and IBM, it's said, isn't far behind. Then there's the Commodore Amiga, which should see the light of the Californian sun around Christmas time, and our old friend the Atari ST 520 is most definitely here in numbers.

Anyway, back to the present and how do the newcomers fare against the QL? Well with 'fingers-on' experience of a 'development' version of the ST (ie, with Digital Research's C Compiler and 68000 Assembler rather than Personal Basic and GEM Write), the answer is quite well all things considered!

Use of the machine brings back memories of early QLs. Okay, so there's no dongle on the ST, but it has the unnerving ability to crash at a moment's notice. This is most apparent when you want to copy a file from one disk to another. And probably something to do with the fact that the machine we're playing around with has only one disk drive.

Although the machine prompts you in all the right places to change disks, it invariably gets bored very early on and falls over. The only recourse is to pump the reset switch with the usual consequence – total loss of data.

Another minor problem is that no editor is provided – something of an oversight on a development machine intended for writing programs! A quick phone call to Atari solved the problem. Apparently, the editor's documentation is not finished yet, which is why it hasn't been shipped to date.

Back to the QL, where we see yet more development tools being made available. Computer One's new monitor excels itself, with wonderful symbolic debugging and inline assembly, and what's more it can clone itself! Then there's Cumana which is reputed to be on the verge of releasing the OS9 'Unix-like' operating system for the QL. This raises only one question – *why?*

In Europe QL sales continue to flourish. However, if our cross channel neighbours seem incapable of designing their own hardware, they excel on another front. English software houses have been surprised to find their products selling even before they have set up a distribution network. Who said piracy went out in the middle ages? Still, this may well explain why so much software now comes with a ROM cartridge though whether this will do any good in the long run remains to be seen. Certainly a few eyebrows will be raised if it is discovered that Sicily's most popular QL peripheral is a 2764/27128 dedicated EPROM blower.

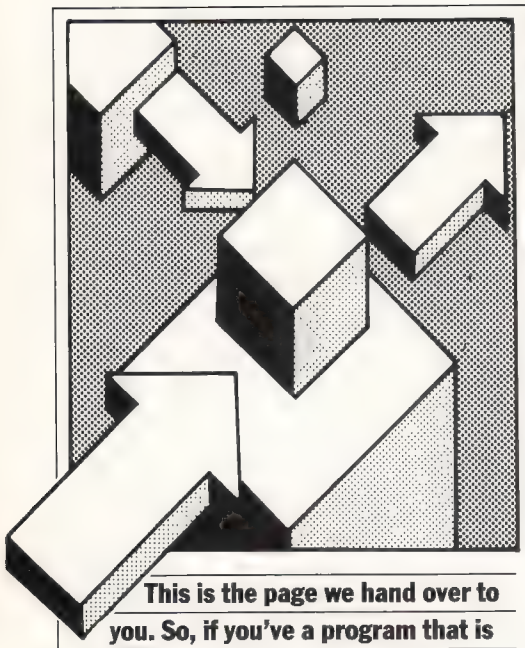
From Europe to the capital of Sweden's silicon valley – Basingfjord. Here the lines buzz like angry bees as para-Medics administer verbal placebos to patients suffering from a variety of maladies. First, there are those for whom the waiting is definitely *not* over and whose patience has been tried and tried again. Others, the guinea pigs, have slipped disks or suffer from a chronic loss of memory. Worse still, there is talk not of a cure but of compensation. Nordic saga or Medical soap opera the performance cannot continue for very much longer, as at least one script writer has refused to write another line of code.

Finally, good news at the C side. Two full Kernigham & Ritchie compilers look set to appear this September. And to answer the question which doubtless is on everyone's lips. Yes, they do support floating point arithmetic and structures. So, if you're waiting patiently to port your Unix software across to the QL now's your chance.

SILHOUETTE

The Publishers wish to point out that the statements and opinions expressed here do not necessarily reflect those of QL User or its staff. Statements made by Silhouette are purely subjective and should be treated as such.

THE PROGS



This is the page we hand over to you. So, if you've a program that is worthy of consideration, send it to 'The Progs', QL User, Priory Court, 30-32 Farringdon La, London EC1R 3AU. We pay for everything published at the usual page rates.

Playfair Cipher

(Refer to Puzzle Page)

If you have no idea of what the question is let alone its answer then you should find the following program indispensable.

```
100 REMark **** Playfair by P J Derlien *****
110 REMark ****     QL User 1985        ****
120 DIM numtext%(1000),boxcontents(26),alphanum(26
),box(2),home_of_letter(26)
130 gettext
140 REPeat mainloop
150   boxalpha
160   showboxed
170   alpha_addresses
180   FOR j=0 TO textlen STEP 2
190     box(1)=home_of_letter(numtext%(j))
200     box(2)=home_of_letter(numtext%(j+1))
210     IF box(1)=box(2) THEN box(2)=home_of_lette
r(23):j=j-1
220     transform
230   END FOR j
240   IF shift=1 THEN EXIT mainloop
250 END REPeat mainloop
260 :
270 DEFine PROCedure boxalpha
280 AT #0,3,0:CLS #0,3
290 a$="ABCDEFGHIKLMNOPQRSTUVWXYZ"
300 FOR j=1 TO 25:alphanum(j-1)=CODE(a$(j)):END FO
R j
310 INPUT #0,"Key phrase?"!k$
320 k=0
330 FOR j=1 TO LEN(k$)
340   n=capcode(k$(j)):IF n=74 THEN n=73:k$(j)="I"
350   IF n<>0
360     n=n-65
370     IF n>9 THEN n=n-1: REMark omit j
380     IF alphanum(n)<>0 THEN boxcontents(k)=n:al
phanum(n)=0:k=k+1
390   END IF
400 END FOR j
410 FOR j=0 TO 24
420   IF alphanum(j)<>0 THEN boxcontents(k)=alphan
um(j):k=k+1
430 END FOR j
440 END DEFine boxalpha
450 :
460 DEFine PROCedure showboxed
470 CLS
480 FOR j=0 TO 4
490   FOR k=0 TO 4
500   n=j*5+k:PRINT CHR$(boxcontents(n));
510 END FOR k
520 PRINT
530 END FOR j
540 AT 1,8:PRINT"Key phrase"
550 AT 3,8:PRINT k$
560 AT 6,0
570 END DEFine showboxed
580 :
590 DEFine PROCedure alpha_addresses
600 FOR j=0 TO 25
610   IF j<>9
620     k=-1
630     REPeat do:k=k+1:IF boxcontents(k)=j+65 THE
N EXIT do
640     home_of_letter(j)=k
650   END IF
660 END FOR j
670 END DEFine alpha_addresses
680 :
690 DEFine PROCedure gettext
700 CLS:CLS #0
710 FOR j=1 TO 5:s$=INKEY$:END FOR j
720 PRINT #0,"D to decipher, E to encipher?"!:s$=I
NKEY$(-1)
730 CLS #0
740 IF s$=="E" THEN shift=1:PRINT #0,"plaintext?":
ELSE shift=-1:PRINT #0,"Ciphertext?"!
750 INPUT #0,text$
760 p=0
770 FOR j=1 TO LEN(text$)
780   k=capcode(text$(j))
790   IF k=74 THEN k=73: REMark treat j as i
800   IF k<>0 THEN numtext%(p)=k-65:p=p+1
810 END FOR j
820 numtext%(p)=23:REMark make up last pair with a
n x if necess
830 textlen=p-1
840 END DEFine gettext
850 :
860 DEFine FuNction capcode(ch$)
870 LOCal c
880 c=CODE(ch$)
890 IF c>96 AND c<123 THEN c=c-32
900 IF c>64 AND c<91 THEN RETurn c:ELSE RETurn 0
910 END DEFine capcode
920 :
930 DEFine PROCedure transform
940 samerow=(box(1) DIV 5 = box(2) DIV 5)
950 samecol=(box(1) MOD 5 = box(2) MOD 5)
960 IF NOT(samerow) AND NOT (samecol)
970   opp_diagonal_move
980 ELSE
990   IF samerow
1000    move_in_row
1010  ELSE
1020    move_in_col
1030  END IF
1040 END IF
1050 END DEFine transform
1060 :
1070 DEFine PROCedure move_in_row
1080 FOR k=1 TO 2
1090   x=box(k) DIV 5:y=(box(k)+shift) MOD 5
1100   transprint x,y
1110 END FOR k
1120 END DEFine move_row
1130 DEFine PROCedure move_in_col
1140 FOR k=1 TO 2
1150 x=(box(k) DIV 5 + shift) MOD 5:y=box(k) MOD 5
1160 transprint x,y
1170 END FOR k
1180 END DEFine move_in_col
1190 END DEFine move_in_col
1200 :
1210 DEFine PROCedure transprint(x,y)
1220 PRINT CHR$(boxcontents(x*5+y));
1230 END DEFine transprint
1240 :
1250 DEFine PROCedure opp_diagonal_move
1260 x=box(1) DIV 5:y=box(2) MOD 5:transprint x,y
1270 x=box(2) DIV 5:y=box(1) MOD 5:transprint x,y
1280 END DEFine opp_diagonal_move
```

Breakout

J Langley

A popular arcade classic transferred to the QL in a little over 50 lines of code. Should take no more than ten minutes type-in.

```
10 REMark **** Breakout by j. langley ****
20 REMark **** QL User 1985 ****
100 MODE 512
110 CSIZE #1,2,0
120 WINDOW #1,512,256,0,0
130 PAPER 0,2,2
140 wall
150 score=0:hiscore=0:start
160 DEFine PROCedure start
170 LET bh=15: LET bv=10: LET v=1: LET h=17:LET b=1:L
ET c=1:vb=23:old=0
180 bn=5:IF score>hiscore THEN hiscore=score
190 AT 19,17:PRINT"Hiscore_";hiscore
200 AT 17,17:PRINT "Score_";score
210 REPeat press:IF KEYROW(1)=64 THEN EXIT press
220 END REPeat press
230 score=0
240 wall
250 AT 15,41:PRINT;bn
260 END DEFine
270 REPeat con
280 AT vb,h:PRINT"----"
290 game
300 start
310 END REPeat con
320 DEFine PROCedure game
330 REPeat loopg
340 IF score>=1560 THEN CSIZE 3,1: AT 3,3:PRINT"You w
in!":CSIZE 2,0:EXIT loopg
350 bat:bat:ball:IF bn=0 THEN EXIT loopg
360 bat:ball:IF bn=0 THEN EXIT loopg
370 END REPeat loopg
380 END DEFine
390 DEFine PROCedure ball
400 AT bv,bh
410 bv=bv+v
420 IF bh<2 THEN b=1:BEEP 1000,50
430 IF bh>38 THEN b=-1:BEEP 1000,50
440 IF bv=vb-2 AND bh<38  AND bh>2 AND v=-1 THEN bh=b
h+b*c
450 bh=bh+b*c
460 IF bv>vb-2 THEN direction:IF bn=0 THEN RETurn
470 IF bv<9 AND bv>4 THEN cwall:ELSE old=0
480 PRINT" "
490 IF bv<2 THEN v=1:BEEP 1000,50
500 IF bv=2 AND bh<38  AND bh>2 AND v=1 THEN bh=bh+b*
c
510 AT bv,bh:PRINT"o"
520 END DEFine
530 DEFine PROCedure direction
540 IF bh=h+3 OR bh=h THEN v=-v:c=RND(1):BEEP 2000,10
0:RETurn
550 IF bh=h+1  OR bh=h+2 THEN v=-v:c=1:BEEP 2000,100:
RETurn
560 check
570 END DEFine
580 DEFine PROCedure cwall
590 IF a(bh,bv)=0 AND old=1 THEN v=-v
600 IF a(bh,bv)=0 THEN v=-v:a(bh,bv)=1:old=1:score=sc
ore+10:BEEP 1000,10
```

```
610 END DEFine
620 DEFine PROCedure wall:CLS
630 DIM a(80,11)
640 LINE  3,0 TO 3,98 TO 140,98 TO 140,0
650 INK 5,2,0:FILL 1: LINE 4,65 TO 4,80 TO 139,80 TO
139,65 TO 4,65:FILL 0
660 INK 7:FOR el= 1 TO 2 STEP .3:CIRCLE 70,73,60/el,.
1,PI/2:NEXT el
670 INK 3,7,0:FILL 1:LINE 60,72 TO 80,72 TO 70,80 TO
60, 72:FILL 0
680 INK 4,7,0:FILL 1:CIRCLE 12,73,7:FILL 0:FILL 1:CIR
CLE 130,73,7:FILL 0
690 INK 4
700 END DEFine
710 DEFine PROCedure lin:in=2:i=0
720 REPeat loop
730 PRINT CHR$(11);
740 in=in+1:IF in=8 THEN LET in=4
750 INK in
760 LET i=i+1:IF i=39 THEN EXIT loop
770 END REPeat loop
780 END DEFine
790 DEFine PROCedure bat
800 imp=KEYROW(1)
810 AT vb,h
820 IF imp=2 AND h>1 THEN h=h-1:AT vb,h:PRINT"---- "
830 IF imp=16 AND h<36 THEN h=h+1:AT vb,h-1:PRINT" --
--"
840 END DEFine
850 DEFine PROCedure check
860 BEEP  30000,50,10,900,40,3
870 PRINT" ":bn=bn-1:AT vb,h:PRINT"    ":AT 15,41:PRI
NT;bn:IF bn=0 THEN RETurn
880 REPeat press:IF KEYROW(1)=64 THEN EXIT press
890 END REPeat press
900 LET bh=15: LET bv=13: LET v=1: LET h=17:LET b=1:L
ET c=1:vb=23:old=0:AT vb,h:PRINT"----"
910 AT bv,bh
920 END DEFine
```

Connect4

A Didcock

The object of this game is to form a line of four counters across either vertical, horizontal or diagonal before the computer does.

```
10 MODE 4:h_scr=0:c_scr=0
15 REMark **** Connect 4 by A Didcock ****
20 REMark **** QL User 1985 ****
30 draw_screen:initialise:f_level:gm=1
100 REPeat loop
105  IF gm AND RND(10)<3 THEN GO TO 130
120  computer_move:win_check
130  human_move:win_check
150 END REPeat loop
200 :
1000 DEFine PROCedure human_move
1005 IF moves>=42 THEN end_game (0)
1020 BEEP 1000,5:AT #5,1,3:PRINT #5,"YOUR MOVE:     "
1040 AT #5,2,16:PRINT #5,"SELECT THE COLUMN USING THE
 CURSOR KEYS";:select_move
1060 AT #5,2,16:PRINT #5,"    YOU HAVE SELECTED COLUM
N ";n;"          ":col=n+3
1080 FOR i=4 TO 9
1090 IF z(col,i)=0:EXIT i
1100 END FOR i
1105 IF z(col,i)<>0:GO TO 1030
1115 piece col,i,1:z(col,i)=1
1117 moves=moves+1:gm=0
1200 END DEFine
1299 :
1300 DEFine PROCedure select_move
1305 LOCal col1,n1,col2
1320 col1=9.9:INK 0:CSIZE 2,0:STRIP 7
1330 AT 18,col1:PRINT "1";n=1
1350 REPeat key_loop
1355  n1=n
1365  key=KEYROW(1):IF key=0 THEN GO TO 1360
1370  BEEP 1000,20:IF key=64 THEN EXIT key_loop
1380  IF key=2 AND n>1 THEN n=n-1
1390  IF key=16 AND n<7 THEN n=n+1
1400  col1=(n*2.9)+7: col2=(n1*2.9)+7:STRIP 2
1410  AT 18,col2: PRINT n1: STRIP 7:AT 18,col1: PRINT
 n
1420 END REPeat key_loop
1430 STRIP 2:AT 18,col1:PRINT n
1440 END DEFine select_move
1999 :
2000 DEFine PROCedure computer_move
2001 IF moves>=42 THEN end_game (0)
2005 again=0:rand=0: hh=0
2010 CLS #5:AT #5,1,3:PRINT #5,"MY MOVE . . ."
2012 IF RND(10)<6 THEN rando=1: ELSE rando=0
2015 IF gm THEN random_move: print_piece: RETurn
2016 IF moves>0 THEN pe=2: en%=1: hh=0
2017 IF moves>3 THEN pe=2: en%=2: hh=0
2019 IF moves>4 THEN pe=2: en%=3: hh=0
2020 REPeat comp
2035  mve=0:IF en%<3 AND hh THEN pe=1
2039  IF RND(10)<6 THEN col1=4:dest=10:inc=1: ELSE co
l1=10:dest=4:inc=-1
2040  FOR i=col1 TO dest STEP inc
2050   FOR f=4 TO 9
2055    IF z(i,f-1)=0 AND f<>4 THEN EXIT f
2060    IF z(i,f)<>0 OR (z(i,f-1)=0 AND f<>4) THEN GO
 TO 2120
2070    IF en%=3 THEN l1=111: ELSE l1=43
2080    FOR g=1 TO l1 STEP 6
2085     IF y(en%,g)=99 THEN EXIT g
2090     a1=y(en%,g):a2=y(en%,g+1):a3=y(en%,g+2):a4=y
(en%,g+3):a5=y(en%,g+4):a6=y(en%,g+5)
2100     IF z(i+a1,f+a2)=pe AND z(i+a3,f+a4)=pe AND z
(i+a5,f+a6)=pe THEN print_piece:IF safe THEN RETurn :
 ELSE EXIT g
2110    END FOR g
2120   END FOR f
2130  END FOR i
2135  IF counter THEN counter_move: GO TO 2160
2140  IF pe=1 AND en%=3 OR en%<3 THEN en%=en%-1
2150  IF pe=2 AND en%=3 THEN pe=1
2155  IF pe=1 AND NOT hh AND en%<>3 THEN pe=2
2160  IF RND(0 TO ran)<1 AND en%<3 THEN random_move:
print_piece: RETurn
2165  IF en%<1 AND (hh OR counter) THEN random_move:
print_piece: RETurn
2170  IF en%<1 AND NOT hh THEN hh=1
2190 END REPeat comp
2299 :
2300 DEFine PROCedure random_move
2310 rand=1
2320 IF gm THEN i=INT (RND(6 TO 8)): ELSE i=INT(RND(4
 TO 10))
2330 FOR f=4 TO 9
2340  IF z(i,f)=0 THEN EXIT f
2350 END FOR f
2360 IF z(i,f)<>0 THEN GO TO 2320
2370 END DEFine random_move
2399 :
2400 DEFine PROCedure print_piece
2405 safe=1
2410 IF en%<3 AND NOT rand AND level=3 THEN SAFE_MOVE
 (f)
2420 IF NOT safe THEN RETurn
2430 piece i,f,2
2440 AT #5,2,19:PRINT #5,"I MOVE IN TO COLUMN ";i-3
2460 BEEP 1000,5:z(i,f)=2:gm=0:moves=moves+1
2480 END DEFine print_piece
2499 :
2500 DEFine PROCedure SAFE_MOVE (ff)
2510 LOCal a1,a2,a3,a4,a5,a6,g
2525 ff=ff+1:IF ff>9 THEN RETurn
2530 FOR g=1 TO 80 STEP 6
2540  IF y(3,g)=99 THEN EXIT g
2550  a1=y(3,g):a2=y(3,g+1):a3=y(3,g+2):a4=y(3,g+3):a
5=y(3,g+4):a6=y(3,g+5)
2560  IF z(i+a1,ff+a2)=1 AND z(i+a3,ff+a4)=1 AND z(i+
a5,ff+a6)=1 THEN safe=0:RETurn
2570 END FOR g
2580 safe=1
2590 END DEFine SAFE_MOVE
2599 :
2600 DEFine PROCedure counter_move
2610 IF pe=1 THEN pe=2: ELSE pe=1
2620 IF pe=2 AND NOT again THEN en%=en%-1
2640 IF pe=1 AND rando AND again THEN en%=en%-1
2645 IF en%=2 AND pe=2 AND NOT again AND rando THEN p
e=1: again=1
2650 END DEFine counter_move
7999 :
8000 DEFine PROCedure win_check
8005 LOCal pe%
8010 FOR i=4 TO 10
8020  FOR f=4 TO 9
8030   pe%=z(i,f)
8040   IF pe%<>0 THEN
8050    IF z(i+1,f)=pe% AND z(i+2,f)=pe% AND z(i+3,f)
=pe% THEN end_game (pe%)
8060    IF z(i,f+1)=pe% AND z(i,f+2)=pe% AND z(i,f+3)
=pe% THEN end_game (pe%)
8070    IF z(i+1,f+1)=pe% AND z(i+2,f+2)=pe% AND z(i+
3,f+3)=pe% THEN end_game (pe%)
8080    IF z(i-1,f+1)=pe% AND z(i-2,f+2)=pe% AND z(i-
3,f+3)=pe% THEN end_game (pe%)
8090   END IF
8100  END FOR f
8110 END FOR i
8120 END DEFine
8999 :
9000 DEFine PROCedure piece(x,yy,n)
9005 LOCal x1,y1
9010 IF n=1 THEN INK 0: ELSE INK 0,7
9030 y1=(yy*10)-5:x1=(x*10)
9040 FILL 1:CIRCLE x1,y1,4:FILL 0
9050 END DEFine
9099 :
9100 DEFine PROCedure f_level
9110 INK 4:STRIP 0:CSIZE 1,0
9120 AT 21,3:INPUT "INPUT THE REQUIRED LEVEL (1=SIMPL
E, 2=MEDIUM, 3=HARD):";level:BEEP 1000,10
9130 IF level<1 OR level>3 THEN GO TO 9120
9140 AT 22,3:PRINT "INPUT THE DIFFICULTY FOR LEVEL ";
level;:INPUT " (1=SIMPLE, 2=HARD):";diff;
9160 BEEP 1000,10:IF diff<1 OR diff>2 THEN GO TO 9140
9170 INK 0:CSIZE 2,1:STRIP 4:AT 5,0
9171 PRINT "LEVEL ";level;:ran=diff*5
9172 IF level=1 THEN ran=ran*.8
9173 IF level=1 THEN l1l=43: ELSE l1l=80
9174 IF level=3 AND diff=2 THEN counter=1: ELSE count
er=0
9175 IF counter THEN ran=ran+15
9180 CLS #5
9190 END DEFine f_level
9199 :
9200 DEFine PROCedure end_game (result)
9210 CSIZE #5,2,0:CLS #5: INK #5,2: AT #5,0,11:PRINT
#5,"G A M E  O V E R":CSIZE #5,1,0:INK #5,4
9230  IF result=0 : AT #5,2,20:PRINT #5,"THE GAME IS
DRAWN": BEEP 0,1,1,4500,0,5,0,9
9240  IF result=1 : AT #5,2,21:PRINT #5,"YOU WIN THE
GAME":BEEP 0,33,77,12000,12
9250  IF result=2 : AT #5,2,22:PRINT #5,"I WIN THE GA
ME": BEEP 0,0,20,5000,100
9260  IF result=1 : h_scr=h_scr+(level*diff)
9270  IF result=2 : c_scr=c_scr+(level*diff)
9350 FOR i=1 TO 4000: END FOR i: BEEP
9360 RUN 20
9370 END DEFine end_game
9999 :
10000 DEFine PROCedure draw_screen
10010 WINDOW 512,256,0,0:SCALE 100,0,0
10030 PAPER 4:BORDER 5,2:CLS:INK 2:FILL 1
10050 LINE 26,23 TO 26,90:LINE 114,23 TO 114,90
10070 FILL 0:INK 4
10090 FOR i=35 TO 90 STEP 10
10100  FOR f=40 TO 100 STEP 10
10120   FILL 1:CIRCLE f,i,4:FILL 0
10140  END FOR f
10150 END FOR i
10160 CSIZE 3,1:INK 2,0,1:AT 0,10:UNDER 1:PRINT "CONN
ECT 4":UNDER 0
10180 OPEN #5,scr_473x40a20x205:PAPER #5,0:INK #5,4:S
CALE #5,50,0,0:CSIZE #5,1,0:BORDER #5,2,7
10200 CLS #5:CSIZE 2,0:INK 0:STRIP 2
```

```
10220 FOR i=1 TO 7:AT 18,(i*2.9)+7:PRINT i:END FOR i
10240 CSIZE 0,0:INK 0:STRIP 4
10250 AT 5,66:PRINT "HUMAN SCORE: ";h_scr
10260 AT 7,63:PRINT "COMPUTER SCORE: ";c_scr
10300 END DEFine
19999 :
20000 DEFine PROCedure initialise
20005 RANDOMISE
20030 i=0:f=0:x=0:yy=0:sf=0:safe=1:DIM z(13,12)
20057 en%=3:ff=0:moves=0:g=0:DIM y(3,81)
20070 RESTORE 31000
20080 FOR i=1 TO 81:READ a:y(3,i)=a:END FOR i
20130 RESTORE 31010
20140 FOR i=1 TO 43:READ a:y(2,i)=a:END FOR i
20175 RESTORE 31020
20180 FOR i=1 TO 43:READ a::y(1,i)=a:END FOR i
21000 END DEFine
21999 :
31000 DATA 1,0,2,0,3,0,-1,0,-2,0,-3,0,0,-1,0,-2,0,-3,
1,1,2,2,3,3,-1,-1,-2,-2,-3,-3,-1,1,-2,2,-3,3,1,-1,2,-
2,3,-3,1,0,2,0,-1,0,-1,0,1,0,-2,0,1,1,-1,-1,-2,-2,-1,
-1,1,1,2,2,-1,1,1,-1,2,-2,-1,1,-2,2,1,-1,99
31010 DATA 1,0,2,0,2,0,-1,0,-2,0,-2,0,0,-1,0,-2,0,-2,
1,1,2,2,2,2,-1,-1,-2,-2,-2,-2,-1,1,-2,2,-2,2,1,-1,2,-
2,2,-2,99
31020 DATA 1,0,1,0,1,0,-1,0,-1,0,-1,0,0,-1,0,-1,0,-1,
1,1,1,1,1,1,-1,-1,-1,-1,-1,-1,-1,1,-1,1,-1,1,-1,1,-1,
1,1,-1,99
```

Kick Start

Barry Ashfield

This ingenious utility enables one to auto start Quill with a customised document in memory. It breaks down into two listings. First a hex loader to set up the machine code and then a boot program generator. The latter is set to generate our magazine's header however by varying line 180 ie,

```
180 default$="start$=chr$(240)&'m'&fill$(chr$(192),5)
&' '&fill$(chr$(192),10)&' '&fill$(chr$(200),5)&chr$(
10)"
```

you could, for example, set the margins. An assembler source listing has been included at the end for those interested in the program's working.

```
   10 REMark **** QL User 1985 ************
 20 REMark * create code for "q_start"  *
 30 REMark ******************************
 100 RESTORE 200
 110 start=RESPR(1024):checksum=0
 120 FOR f=start TO start+145
 130 READ byte:POKE f,byte
 140 checksum=checksum+byte
 150 NEXT f
 160 IF checksum<>13367:PRINT"error in data":STOP
 170 DELETE mdv1_q_start
 180 SEXEC mdv1_q_start,start,146,16
 190 PRINT "q_start saved ok":STOP
 200 DATA 96,14,0,0,0,0,74,251,0,6,113,115
 210 DATA 116,97,114,116,112,11,114,255,116
 220 DATA 1,78,65,42,57,0,2,128,76,36,121,0
 230 DATA 2,128,76,186,138,103,246,44,121,0
 240 DATA 2,128,16,221,252,0,0,0,104,38,110
 250 DATA 0,24,42,110,0,28,12,118,2,1,184
 260 DATA 0,103,8,80,139,183,205,110,66,96
 270 DATA 240,34,110,0,32,210,246,184,2,12
 280 DATA 54,0,6,152,0,102,232,12,182,115
 290 DATA 116,97,114,152,1,102,222,12,118
 300 DATA 116,36,152,5,102,214,40,110,0,40
 310 DATA 217,246,184,4,217,206,50,120,0
 320 DATA 224,56,28,83,68,18,28,78,145,74
 330 DATA 128,102,250,81,204,255,246,114
 340 DATA 255,112,5,78,65
```

```
100 REMark  *************************
110 REMark * create a quill boot to  *
120 REMark * auto-load Quill with a  *
130 REMark * default file or string  *
140 REMark *************************
150 :
160 :
170 REMark *** load document default  ***
180 default$="t$=fill$(chr$(9),4):e$=chr$(10):"&"star
t$=t$&'QL User Magazine'&e$&t$&'Priory Court'&e$&t$&'
30-32 Farringdon Lane'&e$&t$&'London EC1R 3AU'&e$&e$&
t$(1 TO 3)&'Tel 01-251 6222'&e$&e$&t$&'3rd August 198
5'&e$&e$&'Dear Sir,'&chr$(240)&'or3rd'&e$"
190 boot$="CLOSE#1:CLOSE#2:WINDOW#0,400,20,35,215:CLE
AR:"
200 exec$=":exec mdv1_q_start:exec_w mdv1_quill:OPEN#
1,scr:OPEN#2,scr"&CHR$(10)
210 :
220 :
230 REMark *** join the 3 strings and ***
240 REMark *** save the new boot file ***
250 boot$=boot$&default$&exec$
260 DELETE mdv1_boot:OPEN_NEW#3;mdv1_boot
270 PRINT#3;boot$;:CLOSE#3
280 PRINT"quill boot now saved to drive1":STOP
```

```
}
* routine to auto_start quill
* with default basic string named "start$"
* (c)1985 Barry Ashfield for QL User 1985

*     SIZE    16  exec with 16 byte data space

* standard QDOS entry format
START
    BRA.S   SET_PRIORITY skip standard
    DC.L    0            QDOS
    DC.W    $4AFB        entry
    DC.W    6            chars in job
    DC.B    'qstart'     job name
* set priority from 1 (lowest) to 127 (highest)
SET_PRIORITY
    MOVEQ   #$0B,D0      ( MT_PRIOR )
    MOVEQ   #-1,D1       this job
    MOVEQ   #1,D2        lowest priority
    TRAP    #1           set priority
* get pointer to basic key queue
* and wait for new queue to be set up
    MOVE.L  $2804C,D5    ( SV_KEYQ )
WAIT
    MOVE.L  $2804C,A2    ( SV_KEYQ )
    CMP.L   A2,D5         basic queue ?
    BEQ.S   WAIT          yes so wait
* search name table for "start$"
* 1st word = name usage($0201=string var)
* 2nd word = offset from A6 to name in name list
* 3rd long = offset to value in variables area
    MOVE.L  $28010,A6    ( SV_BASIC )
    ADDA.L  #$68,A6      make A6 point to BV area
    MOVE.L  $18(A6),A3   base of name table
    MOVE.L  $1C(A6),A5   top of name table
FIND_STRING_VAR
    CMPI.W  #$0201,0(A6,A3.L) name string variable?
    BEQ.S   TEST_NAME  yes so try for "start$"
FIND_NEXT_VAR
    ADDQ.L  #8,A3      no so A3 to next block
    CMP.L   A5,A3      end of name table ?
    BGT.S   ZAP_JOB    yes so kill job
    BRA.S   FIND_STRING_VAR  no so try next block
TEST_NAME
    MOVE.L  $20(A6),A1     pointer to name list
    ADDA.W  2(A6,A3.L),A1  add on offset for name
    CMPI.B  #6,0(A6,A1.L)  5 chars in name + "$" ?
    BNE.S   FIND_NEXT_VAR  no so try again
    CMPI.L  #'star',1(A6,A1.L)  1st 4 chars = "star"?
    BNE.S   FIND_NEXT_VAR       no so try again
    CMPI.W  #'t$',5(A6,A1.L)    end of name ok ?
    BNE.S   FIND_NEXT_VAR       no so try again
STRING_LENGTH
    MOVE.L  $28(A6),A4    pointer to variable values
    ADDA.L  4(A6,A3.L),A4 A4=string length(word)
    ADDA.L  A6,A4         make A4 absolute
* "start$" found so put default string into key queue
SEND_STRING
    MOVE.W  $E0,A1        ( IO_QIN )
    MOVE.W  (A4)+,D4      get number of chars
    SUBQ.W  #1,D4         set count
Q_LOOP_D4
    MOVE.B  (A4)+,D1      get char
Q_LOOP
    JSR     (A1)          send char
    TST.L   D0            queue full ?
    BNE.S   Q_LOOP        yes so try again
    DBF     D4,Q_LOOP_D4  no so send next char
* all done so remove job and release memory to QDOS
ZAP_JOB
    MOVEQ   #-1,D1        this job
    MOVEQ   #5,D0         ( MT_FRJOB )
    TRAP    #1            kill job
*
END_CODE        END
```

Composer I

James Lucy

You have to be tone deaf to appreciate the QL's music making capability – or so we thought until we discovered this program! With something akin to a Midas Touch the author converts discord into harmony. In its basic form the program allows you to place notes on a musical stave and then play them back – a sort of tuneful composition aid. However, that's just the start.

Once the stave is on-screen you are asked for a pitch that is, notes from A to G across two octaves. These are entered as lower and upper case letters *a* to *g* and *A* to *G* respectively. Sharps can be added where necessary. Also, whilst there is no facility to set an overall key signature at the beginning you can vary the tempo from 40 to 300 crotchet beats per minute (120 is a fair bet).

Following the pitch you need to type in the length of the note from semiquaver (.25) to semibreve (4), dotted notes included (eg, .75 is a dotted quaver) and you may also specify staccato and legato plating styles.

```
100 REMark *****************
110 REMark QL COMPOSER
120 REMark *****************
130 REMark For QL User 1985
140 REMark *****************
150 REMark COPYRIGHT 1985, JAMES LUCY
160 REMark *****************
170 pre_initialise
180 welcome
190 initialise
200 metronome
210 REPeat loader_loop
220 notenum=notenum+1:pagenotecount=pagenotecount+
1
230 IF notenum>899:notenum=notenum-1:pagenotecount
=pagenotecount-1
240 REPeat check_input
250 er=0
260 IF pagenotecount=101:page=page+1:pagenotecount
=1:CLS:stave:current_page=current_page+1
270 status
280 input_pitch:check_pitch:IF er THEN END REPeat
check_input
290 convert_pitch:pitch(notenum)=p
300 input_duration:check_duration:IF er THEN END R
EPeat check_input
310 duration(notenum)=d
320 play p,d
330 display p,d,pagenotecount
340 END REPeat loader_loop
350 DEFine PROCedure stave
360 LOCal a,up
```

THE PROGS

```
370  FOR up=85 TO 5 STEP -20
380   INK 7
390    FOR a=12 TO 0 STEP -3
400     LINE 2,up+a TO 165,up+a
410    END FOR a
420   INK 0
430   LINE 2,up TO 2,up+12
440   LINE 165,up TO 165,up+12
450  END FOR up
460 END DEFine stave
470 DEFine PROCedure crotchet(across,up)
480 FILL 1
490 semibreve across,up
500 FILL 0
510 stick
520 END DEFine
530 DEFine PROCedure minim(across,up)
540 semibreve across,up
550 stick
560 END DEFine
570 DEFine PROCedure semibreve(across,up)
580 CIRCLE across,up,1.5
590 END DEFine
600 DEFine PROCedure stick
610 IF p<12
620 LINE across-1.5,up TO across-1.5,up-8
630 ELSE
640 LINE across+1.5,up TO across+1.5,up+8
650 END IF
660 END DEFine
670 DEFine PROCedure quaver(across,up)
680 crotchet across,up
690 twiddle
700 END DEFine
710 DEFine PROCedure twiddle
720 IF p<12
730 LINE_R TO 2,3 TO 0,3
740 ELSE
750 LINE_R TO 2,-3 TO 0,-3
760 END IF
770 END DEFine
780 DEFine PROCedure semiquaver (across,up)
790 quaver across,up
800 doubletwiddle
810 END DEFine
820 DEFine PROCedure doubletwiddle
830 IF p<12
840 LINE_R TO  0,-1 TO -2,-3
850 ELSE
860 LINE_R TO  0,1 TO -2,3
870 END IF
880 END DEFine doubletwiddle
890 DEFine PROCedure dot(across,up)
900 FILL 1
910 CIRCLE across+3,up+1,1
920 FILL 0
930 END DEFine
940 DEFine PROCedure display(p,dd,nnm)
945 LOCal pp,ddd,nnnm:pp=p:nnnm=nnm:ddd=dd
950 SELect ON nnm
960  =1 TO 20:up=85:across=8*nnm
970  =21 TO 40:up=65:across=8*(nnm-20)
980  =41 TO 60:up=45:across=8*(nnm-40)
990  =61 TO 80:up=25:across=8*(nnm-60)
1000  =81 TO 100:up=5:across=8*(nnm-80)
1010 END SELect
1020 sharp=0
1030 SELect ON pp
1040  =41:change=-6
1050  =38:change=-6:sharp=1
1060  =36:change=-4.5
1070  =33:change=-3
1080  =31:change=-3:sharp=1
1090  =28:change=-1.5
1100  =26:change=-1.5:sharp=1
1110  =24:change=0
1120  =22:change=1.5
1130  =20:change=1.5:sharp=1
1140  =19:change=3
1150  =17:change=3:sharp=1
1160  =15:change=4.5
1170  =14:change=4.5:sharp=1
1180  =12:change=6
1190  =11:change=7.5
1200  =10:change=7.5:sharp=1
1210  =9:change=9
1220  =8:change=9:sharp=1
1230  =7:change=10.5
1240  =6:change=12
1250  =5:change=12:sharp=1
1260  =4:change=13.5
1270  =3:change=13.5:sharp=1
1280  =0:change=.5
1290 END SELect
1300 staccato=0:legato=0
1310 up=up+change
1320 IF ddd>20 THEN ddd=ddd-20:legato=1
1330 IF ddd>10 THEN ddd=ddd-10:staccato=1
1340 IF p>28 :sublines
1350 IF p<>0
1360 IF sharp THEN draw_sharp
1370 IF legato THEN draw_legato
1380 IF staccato THEN draw_staccato
1390 SELect ON ddd
1400  =.25:semiquaver across,up
1410  =.5:quaver across,up
1420  =.75:quaver across,up:dot across,up
1430  =1:crotchet across,up
1440  =1.5:crotchet across,up:dot across,up
1450  =2:minim across,up
1460  =3:minim across,up:dot across,up
1470  =4:semibreve across,up
1480 END SELect
1490 ELSE
1500 SELect ON ddd
1510  =.25:semiquaver_rest
1520  =.5:quaver_rest
1530  =1:crotchet_rest
1540  =2:minim_rest
1550  =4:semibreve_rest
1560 END SELect
1570 END IF
1600 END DEFine display
1610 DEFine PROCedure play(p,dp)
1620 IF dp=0 THEN BEEP:RETurn
1630 IF p=0
1640 BEEP:PAUSE 3000*dp/metro_mark-2
1650 ELSE
1660 SELect ON dp
1670 ON dp=20 TO 100
1680 BEEP -100,p,pitch_2,grad_x,grad_y,wraps,fuzzy
,random
1690 PAUSE 3000*(dp-20)/metro_mark-2
1700 ON dp=10 TO 19
1710 BEEP
1720 tim=3000*(dp-10)/metro_mark-2:PAUSE .15*tim
1730 BEEP dur,p,pitch_2,grad_x,grad_y,wraps,fuzzy,
random
1740 PAUSE .7*tim
1750 BEEP
1760 PAUSE .15*tim
1770 ON dp=.25 TO 9
1780 BEEP dur,p,pitch_2,grad_x,grad_y,wraps,fuzzy,
random
1790 PAUSE 3000*dp/metro_mark-2
1800 BEEP
1810 END SELect
1820 END IF
1830 END DEFine play
1840 DEFine PROCedure convert_pitch
1850 p$=pitch$
1860 IF p$="z" :p=pitch(notenum-1)
1870 IF p$=="r" THEN p=0
1880 IF p$="A":p=41
1890 IF p$="AS":p=38
1900 IF p$="B":p=36
1910 IF p$="C":p=33
1920 IF p$="CS":p=31
1930 IF p$="D":p=28
1940 IF p$="DS":p=26
1950 IF p$="E":p=24
1960 IF p$="F":p=22
1970 IF p$="FS":p=20
1980 IF p$="G":p=19
1990 IF p$="GS":p=17
2000 IF p$="a":p=15
2010 IF p$="as":p=14
2020 IF p$="b":p=12
2030 IF p$="c":p=11
2040 IF p$="cs":p=10
2050 IF p$="d":p=9
2060 IF p$="ds":p=8
2070 IF p$="e":p=7
2080 IF p$="f":p=6
2090 IF p$="fs":p=5
2100 IF p$="g":p=4
2110 IF p$="gs":p=3
2120 IF p$=="EDIT" :editor:END REPeat check_input
2130 IF p$=="DELETE" :delete_last_note:END REPeat
check_input
2140 IF p$=="SAVE" :store_music:END REPeat check_i
nput
2150 IF p$=="PLAY" :play_tune:END REPeat check_inp
ut
2160 IF p$=="LOAD":load_music:END REPeat check_inp
ut
2170 IF p$=="TIMBRE" :sounds:END REPeat check_inpu
t
2180 IF p$=="HELP" :help 0:END REPeat check_input
2190 END DEFine
2200 DEFine PROCedure input_pitch
2210 CLS #0
2220 AT #0,1,20:INPUT #0,"PITCH ? ";pitch$;
2230 IF pitch$="" THEN pitch$="z"
2240 END DEFine
2250 DEFine PROCedure input_duration
2260 AT #0,1,35:INPUT #0,"DURATION ? ";duration$
2270 IF duration$="" THEN duration$="100"
2280 END DEFine
2290 DEFine PROCedure initialise
2300 PAPER 0:CLS:WINDOW 448,200,32,16:PAPER 4:CLS
2310 OPEN #3,scr_448x20a32x236
2320 PAPER #3,2:INK#3,0:CSIZE#3,2,0:STRIP#3,4:CLS#
3
2330 WINDOW #0,448,20,32,216:PAPER#0,7
2340 INK#0,0:CLS#0
2350 stave
2360 END DEFine initialise
2370 DEFine PROCedure check_pitch
2380 IF pitch$="z" AND notenum(2:er=1
2400 IF LEN(pitch$)=2:IF pitch$(1)INSTR "ACDFGacdf
g"=0 OR pitch$(2) INSTR "Ss"=0:er=1
2410 IF LEN(pitch$)>2:IF pitch$ INSTR "EDITeditDEL
ETEdeleteSAVEsavePLAYplayloadLOADTIMBREtimbreHELPh
elp"=0:er=1
2420 END IF
2430 END DEFine check_pitch
2440 DEFine PROCedure check_duration
2450 style$=" ":staccato=0:legato=0
2460 d$=duration$
2470 IF LEN(d$)>1
2480 ch$=d$(LEN(d$))
2490 IF ch$=="S"  OR ch$=="L"
2500 style$=ch$
2510 d$=d$(1 TO (LEN(d$)-1))
2520 END IF
2530 END IF
2540 IF style$=="S" :staccato=1:IF p=0 THEN er=1
```

THE PROGS

```
2550 IF style$=="L":legato=1:IF p=0 THEN er=1
2560 IF d$=".25" OR d$="0.25" OR d$=".5" OR d$="0.
5" OR d$=".75" OR d$="0.75" OR d$="1" OR d$="1.5"
OR d$="2" OR d$="3" OR d$="4" OR d$="100" THEN d=d
$:ELSE er=1
2570 IF staccato THEN d=d+10
2580 IF legato THEN d=d+20
2590 IF notenum>1 AND d=100 :d=duration(notenum-1)
2600 IF d=100 THEN er=1
2610 END DEFine check_duration
2620 DEFine PROCedure metronome
2630 REPeat check_metro
2640 CLS#0
2650 AT #0,1,5
2660 INPUT #0,"Metronome mark ? (Crotchet beats pe
r minute, 40 to 300): ";metro_mark$
2670 IF metro_mark$="" THEN metro_mark$="200"
2680 FOR c=1 TO LEN(metro_mark$)
2690 IF CODE(metro_mark$(c))<48 OR CODE(metro_mark
$(c))>57:END REPeat check_metro
2700 END FOR c
2710 metro_mark=metro_mark$
2720 IF metro_mark<40 OR metro_mark>300:END REPeat
 check_metro
2730 CLS #0:BEEP 500,0
2740 status
2750 END DEFine metronome
2760 DEFine PROCedure delete_last_note
2765 REPeat deletel
2770 IF notenum=1 THEN RETurn
2780 IF pagenotecount=1 THEN RETurn
2790 notenum=notenum-1:pagenotecount=pagenotecount
-1
2800 INK 4:display pitch(notenum),duration(notenum
),pagenotecount:INK 0
2810 pitch(notenum)=0:duration(notenum)=0
2815 CLS#0:PRINT #0,"  Delete another note ? (y/n)
"
2817 dln$=INKEY$(-1):IF dln$=="Y" :END REPeat dele
tel
2820 END DEFine delete_last_note
2830 DEFine PROCedure play_tune
2840 FOR note=1 TO notenum-1
2850 play pitch(note),duration(note)
2860 END FOR note
2870 END DEFine play_tune
2880 DEFine PROCedure crotchet_rest
2890 LINE across,up
2900 LINE_R TO -2,7 TO 2,-2 TO 2,2 TO 0,-.3 TO -2,
-2 TO -2,2
2910 END DEFine
2920 DEFine PROCedure quaver_rest
2930 LINE across,up
2940 LINE_R TO 2,7 TO -2,-2 TO -2,2 TO 0,-1 TO 2,-
2 TO 2,2
2950 END DEFine
2960 DEFine PROCedure semiquaver_rest
2970 LINE across,up
2980 LINE_R TO 2,7 TO -2,-2 TO -2,2 TO 0,-1 TO 2,-
2 TO 2,2 TO -1,-1 TO -2,-2 TO -2,2
2990 END DEFine
3000 DEFine PROCedure minim_rest
3010 LINE across,up+5.5
3020 LINE_R TO 3,0 TO 0,.5 TO -3,0 TO 0,.5 TO 3,0
3030 END DEFine
3040 DEFine PROCedure semibreve_rest
3050 LINE across,up+7.5
3060 LINE_R TO 3,0 TO 0,.5 TO -3,0 TO 0,.5 TO 3,0
3070 END DEFine
3080 DEFine PROCedure editor
3090 CLS#0
3100 REPeat editor_loop
3110 PRINT #0,"       (c)ontinue,  (p)lay,  (a)lte
r note,  (s)elect page ? "
3120 PRINT#0,"           Press letter in brackets,
 then 'ENTER'";
3130 INPUT #0, choice$
3140 IF choice$="c"OR choice$="C" THEN
3150 IF current_page<>page THEN
3160 stt=(page-1)*100+1:CLS:stave:ntm=0
3170 FOR cpp=stt TO stt+pagenotecount-1:ntm=ntm+1:
display pitch(cpp),duration(cpp),ntm
3180 current_page=page
3190 END IF
3200 EXIT editor_loop
3210 END IF
3220 IF choice$=="p" :play_page
3230 IF choice$=="a" :change_note
3240  IF choice$=="s":show_page
3250 END REPeat editor_loop
3260 END DEFine editor
3270  DEFine PROCedure show_page
3280 IF page=1 THEN RETurn
3290 REPeat check_page
3300 CLS #0:INPUT #0,"  Which page ?";page$
3310 IF CODE(page$)<49 OR CODE(page$)>57 THEN END
REPeat check_page
3320 selected_page= page$(1)
3330 IF selected_page>page:END REPeat check_page
3340 IF selected_page=current_page THEN RETurn
3350 CLS:stave:cp=0
3360 sta=(selected_page-1)*100+1:sto=sta+99
3370 IF selected_page=page THEN sto=sta+pagenoteco
unt
3380 FOR sp=sta TO sto
3390 cp=cp+1
3400 display pitch(sp),duration(sp),cp
3410 END FOR sp
3420 current_page=selected_page
3430 status
3440 END DEFine
3450 DEFine PROCedure play_page
3460  show_page
3470 highlight=0:CLS#0
3480 PRINT #0,"     Press 'h' for highlight on pla
yed notes:";high$=INKEY$(-1)
3490 IF high$=="h" :highlight=1
3500 REPeat check_sele
3510 CLS #0:PRINT #0,"      (W)hole page, line(1),
 (2), (3), (4), (5), (m)etronome ?"
3520 PRINT #0,"             (Press letter or numbe
r in brackets)":ss$=INKEY$(-1)
3530 se=CODE(ss$)
3540 bp=(current_page-1)*100+1
3550 SELect ON se
3560  =119:start=bp:stp=bp+99:upp=85
3570  =87:start=bp:stp=bp+99:upp=85
3580  =49:start=bp:stp=start+19:upp=85
3590  =50:start=bp+20:stp=start+19:upp=65
3600  =51:start=bp+40:stp=start+19:upp=45
3610  =52:start=bp+60:stp=start+19:upp=25
3620  =53:start=bp+80:stp=start+19:upp=5
3630  =77:metronome:END REPeat check_sele
3640  =109:metronome:END REPeat check_sele
3650  =REMAINDER :END REPeat check_sele
3660 END SELect
3670 IF current_page=page :IF stp>bp+pagenotecount
 :stp=bp+pagenotecount
3680 IF current_page=page :IF start>pagenotecount+
bp:RETurn
3690 IF highlight
3700 acrs=8:INK 4
3710 FOR note=start TO stp
3720 OVER -1:CURSOR acrs,upp,0,0:PRINT"*"
3730 play pitch(note),duration(note)
3740 CURSOR acrs,upp,0,0:PRINT"*"
3750 acrs=acrs+8:IF acrs=168 THEN acrs=8:upp=upp-2
0
3760 END FOR note
3770 OVER 0:INK 0
3780 ELSE
3790 FOR note=start TO stp:play pitch(note),durati
on(note)
3800 END IF
3810 END DEFine play_page
3820 DEFine PROCedure drawpointer(h,ac)
3830 OVER -1
3840 INK 7
3850 LINE ac,h-3
3860 FILL 1
3870 LINE_R TO 2,2 TO -2,2 TO -2,-2 TO 2,-2
3880 FILL 0
3890 INK 0
3900 OVER 0
3910 END DEFine drawpointer
3920 DEFine PROCedure change_note
3930  show_page
3940 CLS#0:PRINT #0,"  Use cursor keys to move ind
icator to note to be changed.":PRINT #0,"  Press '
c' when satisfied."
3950 counter =1:h=85:ac=8
3960 drawpointer h,ac
3970 REPeat cursor_loop
3980 cur$=INKEY$(-1)
3990 cur =CODE(cur$)
4000 limit=100:IF current_page=page THEN limit=pag
enotecount-1
4010 SELect ON cur
4020 ON cur=192
4030 IF counter>1 THEN drawpointer h,ac:ac=ac-8:dr
awpointer h,ac:counter=counter-1:IF ac=0 THEN draw
pointer h,ac:ac=160:h=h+20:drawpointer h,ac
4040 ON cur=200
4050 IF counter < limit THEN drawpointer h,ac:ac=a
c+8:drawpointer h,ac:counter=counter+1:IF ac=168 T
HEN drawpointer h,ac:ac=8: h=h-20:drawpointer h,ac
4060 ON cur=208:IF counter > 20 THEN drawpointer h
,ac:h=h+20:counter=counter-20:drawpointer h,ac
4070 ON cur=216:IF counter<limit-19 THEN drawpoint
er h,ac:h=h-20:counter=counter+20:drawpointer h,ac
4080 ON cur=67:make_change:drawpointer h,ac
4090 ON cur=99:make_change:drawpointer h,ac
4100 ON cur=REMAINDER :EXIT cursor_loop
4110 drawpointer h,ac
4120 END SELect
4130 END REPeat cursor_loop
4140 drawpointer h,ac
4150 END DEFine
4160 DEFine PROCedure make_change
4170 note_number=(current_page-1)*100+counter
4180 CLS#0:PRINT#0,"    Delete note -'d': Change n
ote -'c': Insert note -'i': Escape -'e'";
4190 INPUT#0, act$:drawpointer h,ac
4200 IF act$=="e" THEN CLS#0:AT #0,1,20:PRINT#0,"P
ress any key to return to editor. ":RETurn
4210 IF act$=="d" :delete_note
4220 IF act$=="i" :insert_note
4230 IF act$=="c"
4240 INK 4:display pitch(note_number),duration(not
e_number),counter:INK 0
4250 REPeat check_new_note
4260 er=0
4270 input_pitch:check_pitch:IF er:END REPeat chec
k_new_note
4280 convert_pitch
4290 input_duration:check_duration:IF er=1:END REP
eat check_new_note
4300 display p,d,counter
4310 play p,d
4320 pitch(note_number)=p:duration(note_number)=d
4330 END IF
4340 REMark
4350 status
4360 CLS#0:PRINT #0,"Use cursor keys to continue c
hanges. Press 'c' when cursor is in position."
4370 PRINT#0,"               Press any other key t
o return to editor."
4380 END DEFine
```

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DEALER INQUIRIES WELCOME

THE SPORTING SCREEN

MATCH POINT

Even without the Pimm's this tennis simulation is bound to keep you off the court and strapped to the QL.

Few will forget the excitement and fervour Wimbledon generated. If like me, the seemingly effortless success of young Boris fired you to make the quantum leap from armchair professional to centre court prodigy. Wiping the dust from your attic-warped Rod Laver special you strolled on court, only to see fame and fortune fade in mistimed shots, tactical faux pas and tennis elbow. Don't give up hope.

Psion's *Match Point* tennis simulation provides the kind of hi-tech training that would put the most expensive tennis clinic to shame. The tennis racket – the greatest single obstacle to excellence on court – has been done away with. In its stead the players may choose between cursor and function keys, or joysticks. Our in-house pro recommends the latter for those aiming to make any impact on the tennis scene.

The last rounds in an open championship provide the setting for the game. Here, you may opt to play a fellow joystick twiddler or a computer opponent. The latter plays an extraordinarily good game even at the quarter-finals stage. Lightning reflexes, anticipation and a thorough grasp of real-life tennis tactics are a must for potential finalists.

The game is viewed, not at ground level but from a commentary box overlooking one end of the court. This vista gives the illusion of a three dimensional scene. When the ball is played it casts a shadow which enables the player to determine its trajectory and velocity, and so distinguish between say, a lob or a forehand drive. Court positioning takes some getting used to, as it varies depending upon which end you're playing at. However, the overall effect adds to the games appeal and realism.

Playing a stroke is straightforward, provided that you are in the right place at the right time, you simply press space bar or fire button on your joystick. Your stance and timing of the swing determine the direction, angle and speed of the return. In line with current tournament practice, matches are played over three to five sets with a tie-break at 6-6 and players change ends at the end of every odd numbered game.

Match Point's graphics are particularly impressive. Animation is fluid throughout and includes some neat finishing touches. Ball boys scamper across the court, line judges raise their arms to call 'out', and players dither at the net when exchanging ends. All that's missing is an option to contest the umpire's decisions or berate your opponent's skill!

Produced by Psion under licence from D & L Research there can be little doubt that *Match Point* will be as big a hit on the QL as it was on the Spectrum. As a one player game it should provide many hours entertainment for the seasoned computer gamer. As a two player game it gives a good rainy day alternative for tennis fans everywhere.

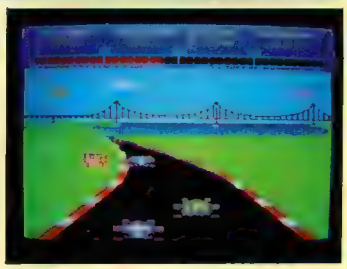
Available from: Psion Ltd, Freepost, 22 Dorset Square, London NW1 1YP, £14.95 & £1.00 p&p.

HYPERDRIVE

Another simulation game – this time for racing fanatics

English Software have produced games for virtually every 8-bit home computer and are best known for their chart topping Atari games. *Hyperdrive*, a motor racing simulation, marks their first sortie into the 68000 field.

The game is fairly straightforward. Using the cursor keys or joystick to control a grand prix racer, you have to claw your way back from last place (26th) into pole position. The race itself is broken up into five stages, each represented by a different screen. To qualify for each stage you have just forty seconds in which to make it into the first five. As you progress collisions with other racers become increasingly



difficult to avoid. Whilst not fatal these will knock you back three or four places.

The illusion of forward motion is created by markers alongside the racetrack which switch from red to white, faster and faster, as you accelerate. This is reinforced by signposts which loom out of the distance and flash past you on either side. This effect works well and combined with elaborate backgrounds ranging from snow capped mountains to moonlit city scapes makes this a fast moving and colourful game.

Racing simulations are certainly not new to home computers and not surprisingly *Hyperdrive* has much in common with those that have gone before. Sadly, the game does not seem to have benefitted from the QL's advanced specification. For example, the race track does not meander to and fro across the screen but is fixed so that the driver need only concern himself with avoiding collisions. Also there is no facility to change gear. To accelerate or brake you need only push the joystick forward or pull it back. These omissions detract from simulation's realism and reduce its appeal.

£14.95 – Available from Philip Morris, English Software Company, 3rd Floor, No. 1 North Parade, Parsonage Gardens, Manchester M60 1BX.

MICRODRIVE EXCHANGE

Each month, for a trial period, this column will contain details of readers' programs that we are able to offer on microdrive.

In return for a small administration charge (per program – including a royalty for the author), we will copy onto blank microdrives any or all of the featured programs.

Each program will be a direct copy of the published listing, or an extended version of that listing where the program in question was too long to print in full (programs for which an abridged version has been published are marked with an asterisk).

It must be stressed that we are not selling the software itself, nor providing any guarantee that it performs any particular function (though we do check every program that is to appear in *QL User*), we are merely offering a service to readers who wish to obtain *QL User* programs on drive rather than by typing them in straight from the page.

HOW TO ORDER

Listed below are programs which have appeared as listings inside *QL User*.

To the right of each program entry is a small box, which you should mark with a bold cross if you want to order that program.

Once you have put a cross next to all the programs you wish to have copied onto microdrive, simply complete the rest of the order form and send it along with your PO/cheque AND BLANK FORMATTED DRIVE to:

QL User, MICRODRIVE EXCHANGE, Priory Court,
30-32 Farringdon Lane, EC1R 3AU.

If you wish us to supply the drive, please add an extra £2.50 for every drive required and mark the order form appropriately.

Please allow 28 days for delivery.

ORDER FORM

Author	Language	Program Name	Price	Issue	Size
Giles Todd	(B)	DIY Assembler	£5.00	Jun/Mar	120 ☐
Converts Assembler source into m/c object code					
Richard Cross	(MB)	Function Key Definer	£2.00	May	20 ☐
Programmable function keys just like on the BBC					
A Didcock	(B)	Connect4	£1.00	Sept	15 ☐
Pit your wits against the QL					
Shergold & Tose	(B)	* Golf	£2.00	May	35 ☐
From fairway to green on 50 different courses of varying difficulty					
Williams & Holliday	(AO)	Paladin	£5.00	Apr	70 ☐
The basis of our games programming series – a space invaders type game written entirely machine code					
Richard Cross	(MB)	Sprite Animation	£2.00	Apr	50 ☐
A subtle blend of machine code and SuperBasic that produces a versatile sprite designer and high speed animator					
Steve Deary	(B)	Pacman	£1.00	Mar	20 ☐
A reasonably fast rendition of the famous arcade favourite					
Andy Carmicheal	(B)	Family Tree	£3.00	Aug	50 ☐
Archive program and database for setting up and displaying large family trees					
QL User	(B)	Tape Utility	£3.00	Feb	20 ☐
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Mathew Capp	(B)	Miners	£2.00	Aug	30 ☐
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PJ Smith	(B)	* DIY Adventure	£1.00	Feb	60 ☐
A skeleton framework where you simply have to slot in the details to create your bespoke adventure					
R Green	(B)	Othello	£1.00	Aug	25 ☐
A 3D version of the well known board game Othello for one or two players					
S J Ackers	(B)	*Touch Type	£4.00	Aug	80 ☐
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B = SuperBasic, AO = Assembler + Object Code (ready to run), MB – Machine Code + Basic loader

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Address_____

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Please copy onto microdrive the programs above which I have indicated with a cross. I enclose a cheque/PO to the value of £..... (made payable to *QL User*). I understand that *QL User* only undertakes to SUPPLY these programs (copied onto microdrive) and accepts no liability for their operation as defined by the author. Neither can *QL User* supply additional information about any of the listings other than that originally printed in the magazine (any article reprints required must be ordered and paid for separately at £1 each inclusive of post and packing).

*Subscribers to QL User may deduct 10% off the Sub Total on their orders.

INSTANT ACCESS

Each month this directory is updated with new products and information.

If you or your company are currently manufacturing hardware or supplying QL software and would like to be included within this directory, just send details to 'QL User Reference Chart', Dept SE, QL User, Priory Court, Farringdon Lane, EC1R 3AU.

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Printerland
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04215 66488
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Strong Computer Systems
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17 West Hill, London SW18
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Power International
0705 756715
Mains spike eliminator
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231 Coldhams Lane, Cambridge
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01 527 5493
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Psion
01 723 9408
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Shadowsoft
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Area Radar Controller, Strategy
Snowsoft
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Hungry Harry in the Haunted House, Doom Room: Exod. VIII
Sinclair Research
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Psion Chess
Summit Software
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(Newnes Microcomputer Books £9.95)
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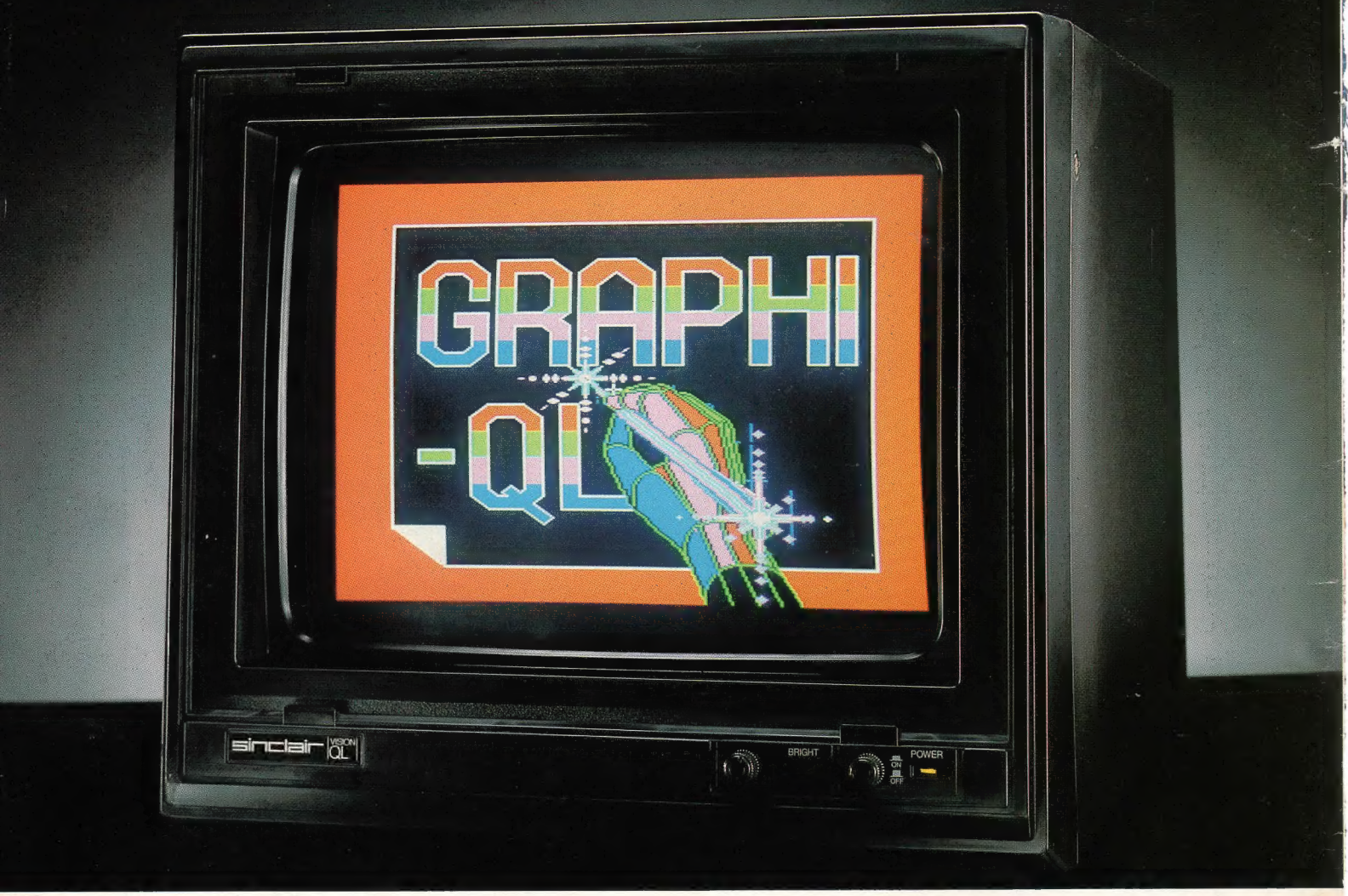

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